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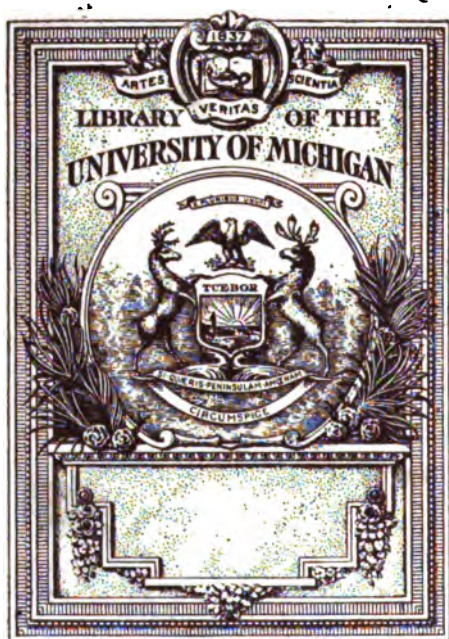
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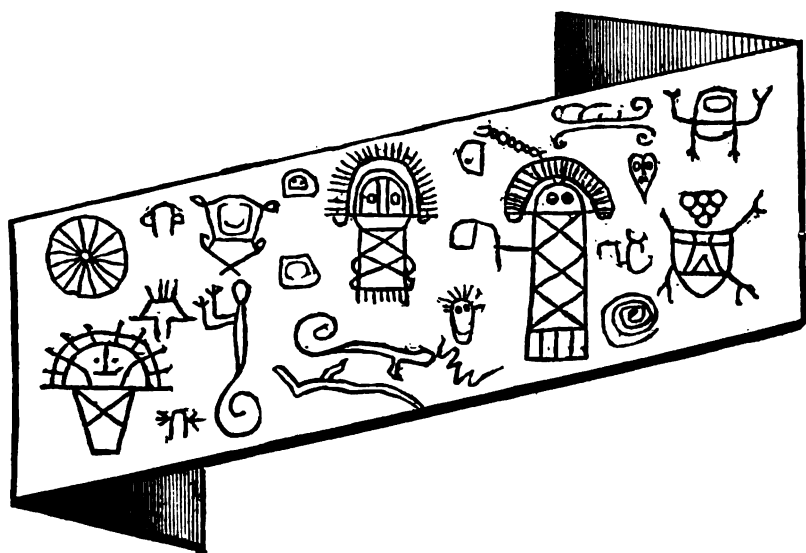
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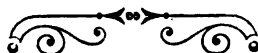
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The Rattlesnake—The Growth of the Rattle.

By the Editor.

THE remarkably specialised *crotalon* or horny caudal appendage of the Rattlesnake, from which the group name (*Crotalidæ*) of this family of vipers has been derived, has been the subject of much observation and investigation, and though its general structure and formation are well-known, there are yet a few points in its history which require further elucidation. Of the causes which were at work in producing this remarkable structure, practically nothing is known, though guesses more or less pertinent may be made; while even as to its real function, there is a considerable amount of uncertainty, though again many of its undoubted uses are apparent. During the last three years, living Rattlesnakes have been under observation in the Museum at frequent intervals, and owing to this and to the fact of my having been able to watch for more than 16 months, the growth of two young rattlers out of a brood of 24 born in the Museum cage, it has been possible to throw some additional light upon the growth of the rattle.

This appendage consists, not of a series of rings as is popularly supposed, but of several, hollow, three-lobed pieces, packed into one another in such a manner that the anterior large lobe *a.*, of each piece, covers the two smaller lobes *b. c.*, of the piece in front it. (Figs. 1 & 2.) This can easily be ascertained by pulling apart the several pieces of a rattle, or by inspecting the terminal piece of an ordinary rattle, though occasionally this is more or less covered by broken portions of lost pieces. The apparent "rings" of a rattle, therefore, are but the covering anterior lobes of the packed pieces.

The manner in which the pieces are held together is interesting and instructive. The anterior free edges of each are incurved into the constriction between the first and second lobes of the piece in front, and as the aperture into the cavity is thus smaller than the swelling of the second lobe included within it, the pieces are securely held together, and some amount of force is necessary to separate them. By the looseness of the fit of one piece into the other, the necessary amount of mobility is attained to produce the rattling sound made by the pieces striking against each other. In Fig. 3, the vertical longitudinal section illustrates the method of interlocking.

The shape of the parts which together constitute the rattle, and their manner of interlocking, are directly due to the form of the extremity of the tail of the snake, where the terminal vertebræ are fused together into one piece, and are covered, not by the ordinary scaly cutis, but by a constricted vascular layer on which the horny parts of the rattle are formed as as epidermis. In many of the allies of the rattlesnake, such as our common *Labarria* (*Trigonocephalus atrox*) and Bushmaster (*Lachesis*

mutus), in which there is a corresponding vascular layer, this is merely sharply conical, from which on exuviation, the epidermal horny scale falls away, leaving visible the newly formed horny spine. But in the Rattlesnakes, the exuviated epidermis of this layer remains attached owing to the constrictions on its surface, and, by a continuation of the process, gives rise to the complicated rattle. If the separable or loose parts be torn away so as to lay bare the real tip of the tail, the vascular cutis will be observed constricted in two places corresponding in shape with the three-lobed pieces of the rattle, the anterior or proximal thickest part being directly continuous with the ordinary integumentary scaly cutis (Fig. 4) and more or less completely covered by the projection of the scales backwards.

During exuviation the epidermal horny covering of this layer becomes free from the under portion, but while the ordinary flexible scaly epidermis of the body is easily cast off, this other part, being of one piece, is with difficulty rejected, since the anterior free edges of the horny matter become curled in, consequent on the drying that takes place after exuviation, and they grasp tightly the under portion. By pressure and movement, however, this separable piece gradually slips back on the smooth under layer, until the free incurved edges meet with the first constriction in front of the swollen second lobe of the tail. Here they sink into the depression, and are thus caught securely against the lobe, and are held in place as a movable piece on the layer of new epidermis. By complete dessication, the horny substance is rendered firmer, thicker, and more closely fastened by shrivelling.

By a repetition of this process, that is after another exuviation, another movable piece becomes added to the appendage, similarly held in place by the swollen second lobe of the tail, while bearing on its own second lobe the previously formed piece. Further repetition leads to the formation of a longer rattle, and if each piece was held in place from birth, the total number of pieces would give exactly the number of exuviations that had taken place. During the early changes of the skin, however, portions are often detached through injuries of various kinds, owing to the weakness of the pieces, and in an adult snake, under ordinary conditions, it is seldom that the pieces are found to be present which were added during early life.

Occasionally true rattlesnakes are observed in which there is no rattle developed, the many-pieced appendage being represented only by a terminal button, on which the constrictions of the normal tail are but barely indicated, and from which the horny cuticle necessarily drops away at each exuviation. In her interesting work on "Snakes" p. 298, Miss C. C. HOPLEY has mentioned an abnormal case of this kind as having been in the Zoological Gardens, London, for more than ten years, and uses it as a proof that the number of joints in the rattle bears no relation to the casting of the skin, since in this case no rattle was developed though several exuviations took place; but the most superficial examination of the form of the tail, a figure of which is fortunately given by her, reveals the fact that the terminal button is quite abnormal, and that the constriction that gives rise to the retention of the cast cuticle, is represented by but the faintest curve, from which each piece of necessity falls away on exuviation.

In this same chapter, which is unfortunately but a blot on an otherwise praiseworthy work, Miss HOPLEY writes "*The theory that the rattle is the remains of cast off cuticle, as some herpetologists have supposed, may be dismissed at once, for what would cause such vestiges to harden into a complicated and symmetrical form?*" (p. 302), and yet proceeds in the following pages to give an explanation which is directly based on this same "theory!" It may be as well, in this connection, to point out that the fact that the rings or links of the rattle are a great deal larger than the '*pièce osseuse*' of the tail, is simply due to the circumstance that they are formed, not directly on this smaller bony piece, but on the larger vascular layer which covers it, and whose size and form the dried links closely represent.

Here too, it may be as well to note another circumstance in which superficial examination might also lead to the dissemination of false notions as to the growth of the rattle. Full-grown rattlesnakes, placed in confinement, often do not thrive from various reasons, and decrease of nutriment naturally leads to decrease in the size of its various parts in the few months or years during which it may exist without satisfactory feeding. The diminished tail leads to the formation of smaller links in the rattle, and on exuviation, the cast scaly cuticle of the part of the tail immediately in front of the appendage, often remains attached to and covering up the newly formed small and thin links, since the larger older links do not easily allow the falling away of the cuticle cast from the shrunken tail in front. After the death of the snake, when the cast cuticle can be detached and the distal scales be bent

back, the small links will be found corresponding to each exuviation that had taken place during the period of semi-starvation. This has been directly noted by me on two different occasions. (Fig. 5.)

A curious feature in the rattle, and one that is due directly to the form of the tail of the Rattlesnake, is found in the fact that in the plane of its greatest width, it is capable, in one direction, of being curved on itself to form a large segment of a circle, while in the opposite direction there is no possibility of such flexure. Miss HOPLEY, in the above named work, p. 305, has noted this peculiarity, and has illustrated it in an excellent figure, though she states her inability to explain it. If the separate pieces of a rattle be closely observed, it will be found that the two sides of each are not of equal length in the plane of the greatest width, and that in the rattle the longer sides of each are towards the same direction; hence when the pieces are fitted together there is a natural allowance of the pieces being flexed in the direction of the shorter sides, and not at all in the opposite direction.

The use of this to the snake will be at once apparent to any one who has the chance of examining either dead or living specimens, for it will be seen that the rattle is carried with the greatest width vertical, and that the possible flexure of the rattle takes place upwards. By this arrangement a greater play of vibration is obtained for the pieces, which move not only laterally, in the general direction of the vibrating tail, but also upwards in the plane of possible flexure; and this greater range of movement is secured without any danger of the rattle being damaged on the ground,

such as might be the case in a condition of downward flexure, or against projecting objects, in one of greater rigidity. During the movement of the snake, the rattle is almost invariably held off the ground, owing to the greater upward curve of the end of the tail, and the repetition of this in each piece of the rattle prevents any inclination towards downward flexure on account of its weight, such as would take place if each side of each piece was of equal length. In this way the chance of injury from foreign objects is lessened, while the moisture of the ground, which would destroy or lessen the sibilant sound of the rattle for the time being, is avoided.

It is a widely prevalent popular belief that the number of rings, that is, separable pieces, of the rattle correspond with the age of the snake—generally understood, in years; but this is certainly not the case. Adult Rattlesnakes, kept in confinement in the Museum cage, have been observed to exuviate at very variable intervals—once in three months, again once in four months and twice in seven months. It may well be that confinement modifies in some degree the normal course, since, in the cases referred to, food was never taken satisfactorily, and the snakes eventually died in a considerably emaciated condition with a markedly diminished size in the segments of the rattle developed during confinement (Fig. 5.) In the case of snakes born in confinement, however, the conditions are more normal, since from birth these are accustomed to their surroundings, and feed and thrive remarkably well.

The following particulars as to two, out of a set of twenty-four, born more than 16 months ago, are noteworthy in this respect. At birth, they were from 9-10

inches in length and $\frac{1}{4}$ to $\frac{1}{2}$ inch thick, and like the other 22 of the set possessed but a terminal elongated horny stump, though under the termination of the scales an anterior piece was to be observed (Fig. 8.) Now, 16 months after, they are more than two feet in length, and more than an inch thick—one which has throughout been the more voracious, being somewhat longer and thicker than the other—and the larger one possesses a rattle of four separable links (Fig. 6), while the other has six of these (Fig. 7), but the individual links considerably smaller than those of its brother. In the case of the smaller snake, with six pieces in the rattle, these correspond with each exuviation, the rattle being perfect, and bearing the terminal elongated stump with which it was born. In the other, with four, three terminal links have been lost, these having been detached during its sixth exuviation. During 16 months, therefore, the one has had seven exuviations, and the other and smaller but six.

From birth they have been fed with mice; and though frogs and small rats have been frequently put into the cage, they have never been eaten, though the rats have always been killed. Of water they drink a considerable quantity, more especially just before exuviation, when they seem to delight in lying in it. A noteworthy feature has been their constant selection of the floor of the cage for coiling previous to exuviation, as though from a desire to get as much moisture from the ground as possible, while at other times they are often found on the little branches placed about their cage.

Of the 24 of the brood, the greater number died owing to the want of a sufficient quantity of mice, and several others

were given away. Five were retained, but three of these died after about six months, one having choked itself while swallowing a colubrine snake (*Dromicus lineatus*) somewhat larger than itself, while another was killed by a bite through the spine from a large rat, which, however, succumbed to the poison of the small snake within four minutes of being bitten. Mice, as a rule, survive the bite for from $\frac{1}{4}$ to 5 minutes, according to the degree of rest which the snake has enjoyed since a previous bite.

It will already have been seen that though the exact age of a snake cannot be told from the number of links in its rattle, yet some trustworthy conclusions may be drawn from its indications. Thus an adult snake can readily be distinguished from a young specimen of the same species, by the shape and size of the links, since where the links at each exuviation are of uniform size, the snake has already reached its adult condition, while the growing specimen is detected by the links increasing in size at each casting of the cuticle. Thus from the rattle shown in Fig. 5, it is evident that the snake was adult, though scarcity of nourishment led to a decrease in the size of the most recently added links, while from Figs. 6 & 7 the youthfulness of the snake may be safely inferred.

The rattles shown in Figs. 7 & 10 may be described as being perfect in the sense that the total number of exuviations since birth are shown, the original terminal button not being lost. It is evident, however, from the size of the links in Fig. 7, that the snake was quite young, while in Fig. 10, it has just reached its adult condition. It is extremely seldom, however, that a rattle of any considerable size is met with retaining the

original button, damage from being caught against grass, sticks and stones being usually the loss not only of this, but of the other small and weak parts. Even in the case of a young snake kept in confinement, where the risk of damage is reduced to the least possible, the detachment of these parts has taken place during one of its exuviations (Fig. 6).

Touching the history of the development of this highly specialised appendage, and the causes which led to it, we are almost entirely in the dark, though it is suggestive that among the other Pit-vipers, *i.e.* those vipers which, like the Rattlesnakes, possess a deep pit between the eye and the nostril, there are existing species which represent all or nearly all the stages that must have been passed through in its increasing complexity. Thus there are its allies which possess no rudiment whatever of a rattle or horny spine, and others which have terminal horny spines which are not constricted. Of those Pit-vipers which possess the constricted tail causing the development of the rattle, there are species with well-developed rattles and others with but small ones; while occasionally, true rattlesnakes are to be met with in which the rattle is reduced to but a terminal stump, exactly comparable to the terminal spines in such genera as *Trigonocephalus*, *Lachesis*, etc.

Under excitement of various kinds, all or nearly all these vipers are observed to rapidly vibrate their tails, and by the contact of the tail against their body and foreign objects, give rise to sounds of various kinds. It is probable that such a habit, in a rocky or stony environment, through a long course of time, might by the action of continued abrasion have given rise to the replace-



ment of the scaly cutis by a harder and continuous cuticular layer or pad, covering over the enlarged or fused caudal vertebræ. The fusion of the terminal vertebræ would be of direct advantage in giving greater rigidity to the vibrating portion for its contact with hard objects. The intensification of the process and the consequent enlargement of the fused parts, would thus have led to the production of the large button, while the projection of the main spinous processes of the vertebræ would give rise to its lobed form, the constrictions between which, the more perfect became the adaptation, would lead to the retention of the cast cuticular pieces to form the sibilant rattle.

EXPLANATION OF PLATE.

The letters a. b. c., are applied to the first, second and third lobes, respectively, of each Piece.

Figs. 1 and 2. Two separable pieces of the rattle.

Of these *b.* and *c.* of Fig. 1, fit into *a.* of Fig. 2, the incurved edge of *a.* Fig. 2, clasping into the constriction between *a.* and *b.*, Fig. 1.

Fig. 3. Longitudinal Section shewing the method of interlocking of the pieces of the rattle, the "ring" of each piece including, and interlocking with, the second lobe of the piece in front.

Fig. 4. The tip of the tail of an adult snake, shewing the form of the vascular layer on which the rattle is developed. The terminal scales are reversed to show the first lobe.

Fig. 5. Adult rattle, showing decrease in size of the pieces last added, due to the want of nourishment consequent on starvation.

- Fig. 6. Young rattle of four pieces, from which three rings and the last or terminal original button have been lost.
- Fig. 7. Young rattle of six pieces, with the terminal original button,
- Fig. 8. Button with which the young rattlers are born, shewing the anterior first lobe under the reversed scales, and the elongated terminal piece.
- Fig. 9. From young rattler after first exuviation, showing one separable piece.
- Fig. 10. Perfect rattle of 13 pieces showing the original button, and the gradually increasing size of the rings—just adult.
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The Struggle for Life in the Forest.

By James Rodway, F.L.S.

GUIANA is, above everything else, famous for its varied and rampant forms of vegetable life. It is a country of magnificent timber trees, elegant palms, wonderful creeping, climbing and scrambling vines, enormous arums, and stately grasses. All of these seem conscious that they have to struggle for existence, and that the fittest only will survive. Here we have no forests of one species,—in which there appears to be something like combination,—but every plant is an individual, and as such, strives with all its might to get ahead of its neighbour, no matter how. Its whole aim and end is to obtain a share of the bright sunlight, which is so plenteously bestowed, but nevertheless is so very hard to get at. As long as the individual succeeds, it does not care what becomes of the others—every one for himself and the sunlight for him who outstrips the others, appears to be their motto.

Myriads of seeds are distributed in every direction; some are eaten by birds, others by quadrupeds and monkeys, while the vast majority are washed away by floods, or die in the first stage of babyhood. A hundred may germinate under one tree, but what poor puny things they are! They try their best to raise themselves towards the light above their heads, but without a share of that light they have no strength. Their seed-leaves are almost colourless, while their stems are so fragile that they often break off by their own weight. One by

one, they fall and die. Here and there however, in some place where a few rays of light have succeeded in penetrating the canopy of foliage, one of them becomes strong enough to get over its first difficulties. Then it uses up all its strength to push its way up and up, until it arrives at the top. It does not waste its energy by spreading in any way, either in the stem or by branching, but straight, and thin as a walking stick, at last forces its way into the sunlight. Now comes a transformation; like a giant forcing his way through a crowd, it pushes out a branch in this direction and another in that, until it succeeds in elbowing itself into a good place.

Except at night, there is no rest in the tropical forest. The struggle goes on all through the year, being perhaps only a little less in the dry season. No nice winter's sleep is possible. Man and the higher animals may take things easy, but not so the trees. In the great cities of Europe men have to carry on just such a struggle, but plants in temperate climates jog along quietly; here the case is reversed. From dawn to sunset, the trees are hard at work—you can almost see some of them growing, and, as may naturally be supposed, they must have a little rest at night. The tree is thoroughly exhausted, its branches lose their stiffness, while the leaves droop and fold themselves together. Unlike those of temperate climates, the trees of the tropics all, more or less, show these signs of exhaustion towards sunset.

Forest trees have not only to contend with each other—this is a fair fight, where, if not equally matched, they are nearly so—but the struggle must be carried on against interlopers of various kinds. Creeping,

twining and scrambling vines are determined somehow or other to get a share of the sunlight. "There is plenty of room at the top;" but they have to get there. Without light, they are, like the young trees, poor, sickly washed out things, hardly able to raise themselves even with the aid of the stems of trees or other climbers like themselves. Some few do succeed however, one way or another—one species of *Bignonia* by means of veritable claws—and, when they get to the top, how they do revenge themselves on the forest trees which have stood in their light. We can fancy one of them saying, "now I am going to smother you." And it does so in many cases. Its branches out, here, there and everywhere, spreading its leaves upon those of its support, until eventually a wealth of brilliant flowers open out, eclipsing those of the tree altogether. As its branches extend the stem swells and hardens until it looks like a great hempen cable which, if it happens to be a twiner, constricts its support in serpent-like folds until perhaps the tree is strangled to death. But this does not matter, for by that time the rampant monster has spread itself over a dozen giants of the forest, where it revels in the sunlight and seems to crow over its victory.

Perhaps the most insidious enemy against which the forest tree has to contend is the class of stranglers, such as *clusias* and figs. Birds eat the fruit of these horrible plants, and deposit the seeds in the topmost forks of some forest giant, where they germinate. One of these succeeds in getting ahead, and, as its leaves open, it extends a number of aerial roots down the trunk of the tree until they reach the earth. There they go, crawling

•

down and like very long worms ; apparently quite harmless, clinging to the bark, but seeming otherwise entirely wanting in either ability or desire to injure. Now the strangler has gained its footing and begins to feel its power. The aerial roots expand laterally, until they actually run into each other, and cover the trunk. We can almost fancy the magnificent forest tree protesting strongly, as, octopus-like, the clusia begins to compress and strangle it. It may protest as much as it likes, but that makes no difference ; the clusia grows stronger and stronger, until by and by, as the strangler opens its magnificent waxy flowers to the sun, and glories in its conquest, the poor unfortunate victim droops and dies. Then the trunk becomes diseased, wood ants begin their work, and finally, nothing is left but the hollow cylinder of the strangler.

There is yet another foe to the giant of the forest, the parasite or blood-sucker, the leech of the vegetable kingdom. Like the leech, it is not very large in comparison with its victim, but that does not matter, as it makes up in numbers what it lacks in size. These plants, called bird-vines (*Loranthaceæ*), are, like the stranglers, distributed by birds. The seeds are covered with glutinous pulp, which, when they are dropped by birds, enables them to adhere to the branches of the trees. Here they sprout, and with their young leaves, produce aerial roots, covered with suckers, which run along and insinuate themselves into the cracks of the bark, continually nourishing themselves on the life-blood of their victims. As the loranth extends itself, it seems to revel in the mischief it is producing, looking bright and happy, in contrast with its miserable victim, whose limbs begin to wither and

fall, until ultimately the branch becomes dry and brittle, when perhaps some day it breaks off by its own weight and comes to the ground, bringing its murderer with it. Sometimes the whole tree will be covered with parasites and ultimately succumb to the continual drain, but more often it survives in a most miserable state of weakness, being hardly able to produce flowers, much less fruit. Like a man suffering under a chronic disease, it drags along its melancholy existence, until all its branches wither, when the parasites, having nothing to live on, suffer a just retribution. However, there are always plenty of others to keep up the fight, as the species are very numerous, while the seeds germinate by thousands.

Although there is a scarcity of the larger animals in the forest, this is compensated by the wealth and variety of the insect world. Ants are present in myriads, some of them making sad havoc on the foliage, and adding to the numerous foes against which the forest giant has to contend. Then there is the great army of wood ants, or termites, which are the scavengers. When a tree is elbowed, smothered, strangled, or sucked to death, the wood ants are ever in readiness to dispose of its remains. However hard the timber may be, it is not too tough for these insignificant creatures. To look at, they appear the weakest of all insects. Unable to stand even the subdued light of the forest, having to build covered tunnels so as to be always in darkness, they are nevertheless able in a comparatively short time to make a fallen trunk as fragile as an egg-shell. In wandering through the forest you come upon an enormous trunk lying across your path. It is too large to step over, so you put your foot upon it, when, with crunch,

crunch, the apparently hard timber crumbles like a mummy, while the wood ants are scattering in every direction to get under cover. In the larval state the insect world is also the sworn foe of the tree. The elegant palm has it canker at the heart in the shape of the borer beetle. These princes of the vegetable kingdom are very tender ; a single larva will kill the strongest of them. There they stand, like kings deprived of their crowns, until the inevitable scavengers come forward and crumble them into mould.

In the great struggle for light, which means life in the forest, there is no place for small herbaceous plants. Such little beauties as daisies and primroses could find no sunny banks or fields to bask in. The ground is strewn with dead leaves and withered petals, which have fallen from the canopy above, and sometimes you pick up a flower or seed and wonder which tree it came from. You look up and try to identify the foliage of some particular tree, but they are so intermingled that this is almost impossible. There is hardly anything to be seen in the dense forest save an interminable jumble of trunks and bush ropes. However, flowers are not entirely absent. Scattered here and there may be found a few leafless root-parasites. One orchid, the *Wulfschlegelia aphylla*, is able to exist in the half-light, together with three species of *Voyria*. Except one of the latter, which is like a miniature yellow crocus, these plants are particularly delicate, poor, pale, sickly-looking creatures, that seem ready to fall to pieces by their own weight, although they are only two or three inches high.

However, herbaceous plants are not wanting in the forest. Let us single out a giant *Mora*, if we can, and

use a glass, when we shall see that its limbs are covered with small plants, which may be recognised as orchids and bromelias. Far above our heads are the representatives of SHAKESPEARE'S "long purples" and the other temperate orchids which decorate the English meadows. There they sit, a hundred to a hundred and fifty feet above our heads, "born to blush unseen," as far as the human eye is concerned. Nevertheless they live, and perhaps enjoy life, doing their work, and doing it admirably. They do not elbow their neighbours, nor do they smother, strangle, or suck them, but simply make use of the topmost branches of the forest giants, as resting places. The orchid grasps its support in a loving manner, holding it tightly, but not like the parasite, to get fat at its expense. No, the orchid has succeeded in making itself almost independent. It is satisfied with a little light; so there is no necessity for interfering with its host. Having as it were, succeeded in getting out of the turmoil of the fight, it decorates the brawny limbs of the forest giant with its brilliant flowers, and invites the bees and butterflies to come to its nuptials.

Although it apparently takes things very easy, the orchid is by no means idle, while its position to-day represents the outcome of generations of steady work. Having no connection with the soil it has to gather its food from the air, rain and dew, and not only to collect, but also to store it. Although rains are frequent enough, still there are dry seasons, when, under the tropical heat, a plant in such a position must wither and die, unless some provision were made for these contingencies. Like the plants of the desert, the orchid stores its food in anticipation of a drought; but every family, and almost

every species, do this in a different manner. Some, like *Oncidium Lanceanum*, lay up their store in thick leathery leaves, so that they can enjoy plenty of sunlight without injury. Others, like the *Cattleya*, have thick leaves and a swollen stem, which latter is one of the forms of the pseudo-bulb, and is peculiar to the orchid family. Where the leaves are thin the pseudo-bulbs are often very large, so that if every leaf should be dried up, the plant still retains its vitality. In some cases the store of food is laid up in cylindrical leaves, some resembling porcupine's quills, others like yard lengths of thick twine; in others there is a plump fleshy stem, which answers the same purpose. A few species have no leaves or pseudo-bulbs; in such cases, their aerial roots perform all the functions of both.

The *Bromeliaceæ*,—wild pines, as they are called, have chosen an entirely different manner of storing water against a drought. Folding the bases of their leaves together and tightly overlapping one upon another, a cup is formed, which retains a store of water for several weeks. Every leaf being a natural gutter leading to this reservoir, the plant succeeds in gathering a little water with every shower, so that it is hardly ever actually dry. Taking advantage of this, a species of *Utricularia*—a strictly aquatic plant—has succeeded in locating itself in these little pools, where it luxuriates far above its swamp-dwelling cousins. Not satisfied with this wonderful contrivance, the Bromelia has also developed a peculiar texture of leaf, almost as tough as horn, but at the same time quite flexible, which enables it to stand such a strong heat and glare as would cripple the more delicate orchid.

Leaving the dense forest, in which only winged creatures can well observe the struggle for life, we come across a river or creek, which, if it is wide enough, breaks the continuity, and allows a streak of sunlight to penetrate. If, on the contrary, the creek be only a narrow one, the forest trees meet overhead, or we paddle our canoe under their trunks and branches, which lean over and almost choke the passage. Where the river is broad the forest slopes down to it, looking at a distance as if there were a high embankment, when actually the shore is quite flat for a long distance behind. Here the struggle for life can be fully appreciated, as the vegetation is nearer the eye. All along the banks, without a single break, shrubs and low trees are densely packed together, each trying to find room for itself at the expense of its neighbour. They take up every inch of available space, extending their branches as far as possible over the stream, while the creeping and scrambling vines take advantage of this to spread themselves over the whole face of the embankment of foliage, festooning it with their gay flowers and revelling in the fact that they have succeeded in "coming over" their supporters. Sometimes retribution overtakes them, as they make the shrub or tree so top-heavy, that, when a flood comes, the roots are loosened, and the swift current tears away the whole mass, leaving the remains of the lately crowing smotherer, bruised, torn and bleeding.

The elbowing which goes on here differs from that in the "high woods" in the fact that, the struggle being so much the greater, the army of combatants has put on armour. There are no weak soft creatures here. Almost as soon as the seedlings grow, they assume their weapons. Cover a

man from head to foot with needles all pointing outwards, and set him to elbow himself through a crowd, and you have something like what is actually the fact with a genus of comparatively low palms, (*Bactris*). The stems are densely clothed with needle-like spines, while the ribs of the fronds have the same aggressive spikes; all seeming to say defiantly "*noli me tangere!*" Not content with a single stem, these palms grow in clumps, every new sucker taking its place beyond the others and pushing its weaker neighbours farther out of the way. Most of the low shrubs have stiff and rigid branches, which of themselves form a protection, but not content with this, they often have short, stiff thorns, ready to tear both the leaves and stems of any young plant which tries to force its way through them. Having to contend against such strong opponents, the climbers put on their armour as well. The *Desmoncus* covers its stem with spines, and insinuates its young fronds through some little gap towards the light. Step by step it ascends, the fronds opening one by one, each provided with a most formidable arrow-head having a dozen pairs of barbs, which effectually hold up the weak trailing stem. These barbs are most dangerous weapons of offence to boatmen coming swiftly down the stream, as they hang over as if fishing for anything that comes in their way.

Beyond the line of bushes and actually in the water, grows the tree-like Mocca-Mocca (*Montrichardia arborescens*), a curious species of aroid which has succeeded in developing itself to a wonderful size. In its young state it is provided with spines, so as to be able to push its way, but as it grows upwards these are no longer necessary, and are therefore not found on the upper

part of the stem. When the water is shallow they form an impenetrable phalanx of several yards deep all along the shore, their stems being often twenty feet high and packed as closely together as possible.

It might be supposed that the grasses other than bamboos would be entirely absent from the forest region, but such is not the case. One species, *Panicum elephantipes*, has succeeded in getting over the difficulties by taking its place as a water plant. Being provided with large creeping hollow stems, it anchors itself to the branch of some tree that meets the water, and from this point extends outwards and along the shore. Growing very quickly, it often covers the surface for some distance from the line of mocca-moccas, and might prove a formidable obstruction, did not the river swell at intervals and carry off large masses, like floating islands, down to the sea.

Beyond the fringe of rampant vegetation, nothing can be seen from the river, but by pushing aside the branches and creepers, so as to get behind the veil, orchids may be seen growing luxuriantly in great numbers. Here live those species that delight in plenty of moisture, and that cannot endure the drier atmosphere which is met with in the "high woods." This is the home of *Zygopetalon rostratum*, which is enabled to flourish and produce its beautiful white flowers in more gloomy recesses than most of the others. It has developed a creeping habit, by which it seems to derive benefit, being able by this means to grow upwards on a branch as the tree extends itself. When this species is plentiful it forms quite a pretty decoration to the rugged branches,

The places where orchids are seen to advantage are not however on the banks of the great rivers, but rather on those that are wide enough to allow a moderate quantity of light to penetrate. Not having sufficient sunlight to produce rampant vegetation, such places are very congenial to a great number of species. High above the water rise the giant moras and other immense timber trees, while here and there a great trunk leans across the creek, its upper surface decorated with creeping ferns, peperomias, and the smaller species of orchids, such as *Pleurothallis* and *Dichæa*. In some of the larger forks grow immense masses of *Oncidium altissimum*—often three or four feet across,—their elegant flower stems being ten or twelve feet high, hanging or curving gracefully over, and loaded with hundreds of pretty yellow flowers. Brassias are also very common, while here and there *Stanhopea eburnea* perfumes the air with its large ivory-white pendulous blossoms. As the creek twists and turns about a new vista is opened at intervals, every short reach, from the different degree of light, showing some diversity in its forms of vegetation. Now, as the creek narrows, the canoe is paddled through a gloomy cavern almost as dark as night, from which the exit appears at a distance like the termination of a tunnel. Then comes a wide bay where the sun shines in all its brilliancy. Here a mass of vegetation chokes the passage, and the cutlass has to be used freely, while a little farther a forest tree has fallen right across the stream, giving perhaps an hour's hard work with the axe before the canoe can be pushed through, hauled over, or drawn under.

On leaning trunks or projecting branches the catasetsums are generally plentiful. There are several

species, which live under entirely different conditions, and taken altogether, this genus is perhaps the best example of adaptation to circumstances in the orchid family. On the borders of the swamps, where only the eta palm will grow, *Catasetum longifolium* finds a congenial home among its lower fronds. There the orchid hangs downward, and waves its long grass-like leaves in the wind. *Catasetum discolor*, as a contrast, has come down to the ground, and on the sand-reef, where the forest trees find it hard to live, this species revels in the poorest soil. Being provided with large pseudo-bulbs, the *Catasetum* endures the change of seasons without injury. Although its leaves are generally thin, and are liable to be dried up during a drought, this does not injure it, as the reservoir of food enables it to wait patiently, and even flower, under such conditions as might be fatal to many other orchids. As if this were not enough, several species have developed a faculty which is almost unique in plants, although well-known in the case of bees, that of producing male or female according to circumstances. In the case of *Catasetum tridentatum*, there are three distinct shapes of flowers, which differ so much from each other that, until SCHOMBURGK found them growing on the same plant, they were described not only as separate species but even different genera. The male was known as *Myanthus barbatus*, the female as *Monachanthus viridis*, while the third form, which appears to be hermaphrodite, went by what is now the name of the species, *Catasetum tridentatum*. When this plant has plenty of food, it produces a spike of female or hermaphrodite flowers, which are thick and fleshy, resembling in shape an old-fashioned woman's cap or sun bonnet. These

flowers and their attendant capsules, require a special effort, and can only be satisfactorily produced when the plant is in good condition. During a drought, when the plant is half-starved, it would be unable to support such a strain, therefore a few lighter and more elegant male flowers are produced, and as there will always be some stronger plants able to produce those of the opposite sex, the work of the weaker is not lost.

If one passes under one of these plants when in flower, a swarm of yellow and black bumble bees (*Eulema dimidiata*) are seen hovering in its neighbourhood and flying from flower to flower. Except in this locality not a single bee is to be seen, and perhaps a collector might search for miles without finding a specimen. But when the *Catasetum* opens, whether it is hidden in the fork of a tree, perched far up among the foliage of the eta, or on sand thrown up from a charcoal pit, the insect is sure to find it out. The flowers are not generally brilliant or showy, neither have they, like the *Stanhopeas*, any strong perfume, but nevertheless the bees discover them at once. Even in Georgetown, where many orchids do not find their fertilising agents and consequently remain barren, no sooner does the spike of flowers open, than the bees swarm round it. However it may be obstructed by foliage, or hidden in some out-of-the-way corner, the buzzing is heard in the early morning, telling any one who has his eyes open that a *Catasetum* is flowering. Having succeeded in attracting the bee from a distance in some unaccountable way, a feast is provided in the shape of a little reservoir of nectar, to procure a sip of which the bee has to bring its head in contact with a pair of incurved antennæ, one of which is very sensitive. Im-

mediately on touching this the cover of the little case containing the pollen masses flies off, and, like a skip-jack, these spring out, when, by means of a sticky disk with which they are provided, they adhere to the back of the insect and are carried to another flower. Here the pollen masses come in contact with the stigma and the flower is fertilised.

Hanging from a creeper or branch may be seen here and there an oval bag-like mass of aerial roots, something like one of the nests of the troupials so common on the silk cotton tree, above which are the pseudo-bulbs and leaves of that wonderful orchid the *Coryanthes*. After throwing out two or three roots to attach itself to its support, it develops an interlacing network all round, in a way almost peculiar to the genus. At first sight it would be hard to say what purpose could be served by such a contrivance, but strike or shake the plant and it will be seen that it is nothing less than a veritable ant's nest. The orchid is, like other plants, subject to the attacks of many foes, such as cockroaches and larvæ, which are particularly fond of the aerial roots. To protect itself against these, the *Coryanthes* has chosen to provide a comfortable nest, wherein a garrison of carnivorous ants find shelter, they, in return for the accommodation being ready to come out and fight at the first alarm of an enemy. Other orchids, which live in the tree tops, are not so subject to crawling insects as those nearer the ground, and for that reason it appears that they have never seen the necessity for this special protection. *Epidendron (Diacrium) bicornutum* has obviously felt this need, and set to work in its own way to accommodate a garrison. Being provided with long cylindrical pseudo-

bulbs, it has left these hollow, and, for a doorway, allowed the shell to split for about a quarter of an inch at the base. In these well protected homes the ants live and thrive, and in return for their lodging, like those of the *Coryanthes*, are a standing terror to evil-doers. Other orchids, such as *Gongora*, provide a half-shelter for ants, but their efforts in that way are of little importance as compared with *Coryanthes* and *Diacrium*.

Having provided a guard against crawling vermin, the *Coryanthes* proceeds to develop a most wonderful flower, in which every part is obviously formed to attract a particular insect. The majority of insect-fertilised flowers are grateful for the visits of either bees, butterflies, or flies, but not so the *Coryanthes*. It has laid itself out only to catch and utilise, without hurting it, a beautiful metallic green bee (*Euglossa aurata*). From the base of one of its pseudo-bulbs, a long flower stem is produced, which pushes itself straight downwards. Upon this it hangs a number of beautiful cups, into each of which a liquid drips from two horn-like processes in the upper part of the flower. Take a china tea cup with a spreading mouth, hang some little flags over the handle, and stick a model of the figurehead of a Polynesian canoe opposite, and you have something like one of them, as it opens itself in the early morning from a bud resembling the swathing of a Chinese lady's foot. The species vary in colour and markings, being generally whitish, or yellow, blotched and spotted with crimson. Their odour, as judged by our standard, is not pleasant, but nevertheless it is very attractive to the bees, which immediately on their opening swarm round in great numbers. Flying towards the flower, as a moth to

a candle, the bee falls into the liquid which covers the bottom, and wetting its wings, is unable to use them. Look into the cup and you will see a dozen bees swimming round and round, or vainly trying to climb the slippery sides, and, if it is the second day after opening, one or two may be seen drowned. It was never the intention of the flower, however, that their lives should be sacrificed, but on the contrary, that they should escape, and in doing so perform the office for which the whole contrivance has been arranged. Under the flags, where the column comes near but does not actually touch the cup, is a narrow opening, through which the bee can push its way out. In doing this it has to use sufficient force to widen the gap, which opens like a spring door, when it comes in contact with the pollen case, ruptures it, and carries off the male organ on its back. Not being able to fly, there is nothing to be done but to crawl over the flower spike, where, heedless of its former trouble it soon finds itself inside another flower. In making its way out, the pollen masses are rubbed on the stigma, and the ovary fertilised, after which it may carry out the pollen masses of this flower in turn to fertilise another.

In observing these wonderful contrivances, of which almost every genus of plants furnishes examples, we are struck with the thought that there must be something like consciousness in some at least of the higher species of plants. What can be more like reasoning than the fact that orchids and many other plants have provided against so many contingencies, some of which may not occur during the lifetime of the individuals? Some of these contrivances do not show a very high standard of morality. It is rather hard upon the butterflies, for

instance, that an orchid should take care to warn them off during the larval stage, while it cordially invites them when they suit its purpose. It seems to say "I will have no ugly crawling worms depending on me, but you may come to my wedding and have a sip of the nectar, when you also have on your holiday dress." In the struggle for life there is not the slightest gleam of anything like benevolence, but on the contrary, selfishness and greed are most prominent. If a flower provides food for the perfect insect, it is simply because in doing this, the plant derives a certain advantage. There is a continual straining of the insect to over-reach the plant, which in its turn does its very best to prevent this. The plant elaborates bitter, noxious and poisonous secretions, but notwithstanding this, some larva or other succeeds in almost every case in overcoming the difficulty. There is hardly a vegetable poison that cannot be eaten by some larva or other, and we may reasonably presume that as the plant concentrates its deleterious secretions, the insect develops its digestive powers to meet the difficulty.

The orchids, above every other class of plants, are examples of the highest individuality. Even the most casual observer will notice that if he has half a dozen plants of one species, they all differ from each other in colour, markings, size, and shape. Every plant is an individual as well as a species, this characteristic being very prominent in nearly all tropical plants. Entirely apart from the environment of the particular plant, which necessarily produces diversities in vigour and size, every orchid may be known and recognized as easily as one of his flock by the shepherd. By artificial selection

desirable varieties of so many garden flowers have been perpetuated, but in the case of the orchids natural selection is continually at work in the forest, the result being the innumerable variations which attract the amateur *Orchidophile*.

Another side of the struggle for life is exemplified on the sand reefs. Extending for miles, large expanses of white ridges vary the monotony of dense forest and stream. Here and there, between clumps of low bushes the open spaces glare with reflected light and heat, while the sand itself is so hot that the bare-footed Indian is obliged to peel two pieces of bark to protect the soles of his feet against it. Without such an excessive rainfall as that of Guiana, these reefs would be quite barren, but under the circumstances, the hardier shrubs and a few trees manage to exist. Where forest trees have succeeded in obtaining a footing they push their roots far down below the surface, where the sand is moist and cool, but finding little food, they naturally grow much slower and are more hardy than the same species in the dense forest. For this reason timber from such places is always highly valued, as being free from sap. Here it is no longer a fight with each other, but a hard struggle for bare existence. Everything is arid and dry, the shrubs being strong and sturdy though small, while the few herbaceous plants have leaves especially fitted to their surroundings. Try to dig up one of these and you may scrape away for many feet before you get beyond the tap root. Here, in contrast with the "high woods," annuals are seen during the rainy season. Not having been able to develop any other special provision, they flower and die, leaving their seeds to germinate

after the drought is over. Orchids abound everywhere upon the low shrubs, while several genera have succeeded in accommodating themselves to the sand itself. Here is a *Cyrtopodium*, with a magnificent panicle of yellow flowers, but what a fine pseudo-bulb is this! Three to four feet long, and thick and fleshy, it contains a store of food against all contingencies. Unlike its relations of the tree-tops, it revels in the glare, only partially screening itself beside the bushes.

There is a certain amount of uniformity in the "high woods," notwithstanding that two trees of the same species are hardly ever seen together. The conditions being the same, and there being no room for developing many special peculiarities, the result to an ordinary traveller is rather monotonous. The sand reefs, on the contrary, show a fertility of invention. Here, some kinds of plants entirely alter their character with their habitat. A fern, (*Schizæa*) instead of showing the delicacy of form and texture common to the order, has changed itself into a wiry grass-like creature, without beauty or comeliness. Lichens and mosses take advantage of the slight screen of the clumps of bushes, and grow on the sand as well as on the branches. Climbers run along the sand, while the demon clusias flourish without strangling their neighbours. Plants whose relatives are forest giants, dwindle here to little dwarf shrubs of a few inches high, with small leaves densely covered with hair or down to collect the dew which falls so plentifully in the dry seasons.

Much more could be said on the various aspects of this great struggle. Every species, and even every individual, is worthy of attention. It would almost seem

as if thousands of species would fall and become extinct, and that such has been the case there can be no doubt. Nevertheless there are so many provisions against this, that on the other hand we see that such a thing is comparatively rare. Opposed to the thousand chances against the individual, nature has provided a thousand and one in its favour. A tree with a multitude of flowers will produce one or two seeds to each, while an orchid with only a few often numbers its seeds by tens of thousands. Some trees have fruits which are food for beasts, birds and fishes, but with all this there will always be a few left to produce others of the same species.



The Berbice Industrial Exhibition, 1891.

By E. D. Rowland, M.B., C.M., Honorary Secretary, Exhibition Committee.

THE proposal to hold an Exhibition in New Amsterdam originated from the Committee of Correspondence of the Royal Agricultural and Commercial Society. In a letter to Mr. MCKINNON, dated April 12th 1890, Mr. QUELCH, the Honorary Secretary, pointed out that the Committee had the sum of \$800 at their disposal, which they were willing to give to a committee of gentlemen of this town for the object of holding an Exhibition for the artizans and farmers. Some correspondence followed, and Mr. MCKINNON finally called a meeting, which was well attended, at the end of June last year. This meeting, under the chairmanship of the Sheriff of the County (Mr. J. E. HEWICK), at once took practical steps in the matter, and a series of resolutions were passed fixing the date of the Exhibition (January 28th and 29th, 1891) and defining its scope. An influential Committee was elected, and from these a special directing body was nominated into whose hands the work of preparing for the Exhibition was committed. Sheriff HEWICK was made President, and Messrs. D. MCKINNON and ROWLAND elected Hon. Treasurer and Secretary, respectively. In accordance with the resolutions passed at the general meeting, a subscription list was opened and the sum of \$988 96 was collected. The work entailed on the Treasurer to gather this amount can only be known by those who have to collect money for any big scheme. At the same time the work

was lightened by the generous response given by every one to all his appeals. Every one asked for practical purposes gave.

The intention to hold an Exhibition was widely advertised in the local press and in one of the Georgetown papers. The town and County were placarded with large posters, and from time to time circulars were distributed freely to the people. A series of meetings was held in the various villages of the County, more especially on the river banks near town, and the various clergymen of their parishes presided and explained the objects of the show. The Rev. Mr. ANDERSON worked hard in this direction on the Corentyne Coast of the County. Local village committees were appointed in many places and helped considerably in popularising the idea of the show. A meeting was held in New Amsterdam in September, but was not well attended. Towards the end of the year a meeting was held in the Edinburgh school-room when the President of the Committee presided and made a strong appeal to the people, with the result that there and then some 80 villagers pledged themselves to become exhibitors. Hereafter all doubts as to the success of the Exhibition were dispelled. Entries poured in on the Secretary from all sides, and ultimately totalled some 2,000.

During this time a comprehensive prize list was drawn up and distributed by the Council. \$1,200 was promised as prize money, and all the local trades and industries were offered rewards; in many cases these were handsome sums of money. His Excellency the Governor readily acceded to the request of the Council to open the Exhibition, and generously

donated \$100 to help the finances. Lady GORMANSTON was equally gracious later on, and, though far from well, gave a certain number of the prize-winners their awards. The Board of Superintendence of the town placed at the disposal of the Council, almost free of cost, the use of the Town Hall. This was the largest building the Council could obtain or rather that existed in the town, and when the exhibits poured in from all parts of the colony—from Orealla on the one side to Mazaruni on the other—a considerable amount of ingenuity was required to pack them in the limited space. Ultimately, a considerable number of the larger vegetables were placed in a portion of the market below the Hall. The walls of the Hall were covered with the exhibits, and then even some of them could not be properly displayed for want of room. This was especially marked in the sewing and fancy work, as well as with the starches and other prepared food stuffs. By dint of hard work in which nearly all the Council took active part, and with a band of willing workmen, everything was in order in time, and a most successful show was opened by His Excellency Lord GORMANSTON on the 28th January.

That the show was popular was demonstrated by the amount of gate money taken, for the most part in sixpences, no less a sum than \$300 being received, over 3,000 persons passing through the doors in the short space of time of about 24 hours for which the show was opened. It is obvious that it could have been kept open for a much longer period. The Council gave free entry to about 100 patients of the Asylum.

The Council had asked several gentlemen of experience to become judges, and here also they received

willing help, though at the end, through one cause and another, many who had promised to give their services were unable to fulfil them. A notable exception was the hon. B. H. JONES, the President of the Royal Agricultural and Commercial Society, who came to New Amsterdam especially and at some inconvenience to himself. So also Mr. WABY, of the Botanic Gardens, Georgetown, rendered us valuable and willing service, he and Dr. FERGUSON of the Public Lunatic Asylum doing all the judging of the numerous exhibits in classes I, II and IV. The thanks of the Council are also due to the committee of ladies, Mrs. FARRAR and Mrs. D. and N. MCKINNON, who gave so much time to the judging of the sewing and fancy work, in which class the entries were most numerous, and the competition keenest, often it being a matter of considerable difficulty to decide which article in any subdivision was the best. In this class a large number of extra prizes were given. The judging of classes V and VI was taken by the President of our Committee, Mr. N. MCKINNON and the Hon. Secretary. In class VII in which it is to be regretted so few of the sugar estates took part, the Hon. B. H. JONES and Mr. WELCHMAN officiated, and for tailoring the willing help of Mr. BELASCO was at the last moment obtained. The report of the judges has been more or less indicated in the preceding paragraphs, but can be shortly summarized as follows :—

CLASS I—*Fruits and Vegetables.*—The display for the time of the year was good on the whole, but in the individual articles there was distinct evidence of want of care in the selection of fruits and vegetables, and a marked tendency to depart from the conditions of the

Exhibition as laid down by the Council. For example, in the plantain competition one man entered two beautiful bunches, but of course could not be given the prize as three were required by the prize list. So also some good sweet potatoes and cassava were mixed with some of a very inferior quality.

CLASS II—*Prepared Food Stuffs.*—The starches were poor as a whole and the jellies valueless, the only really good exhibit in this class being some preserved citron for which an extra prize was awarded. Cocoa was exhibited by Messrs. PEROT, BARNARD and WABY, as well as by Pln. *Mara* which took the first prize. The Council regret that though so much rice is grown along the lower part of the Corentyne Coast by the East Indian immigrants, and in spite of three prizes being offered, the competition was limited to some half dozen exhibitors and no coolies entered for it.

CLASS III—*Needlework, Tailoring, Basket-work, Shoemaking, etc.*—Mention has already been made of how numerous the entries were, and how keen the competition. Prizes to the amount of \$229 were offered in the class and \$251 was ultimately given, the extra prizes being so numerous. As a whole, this was the best class in the Exhibition, and, in spite of our President's reflection on the holey stockings, speaks well for the women of the County. It may be noted that the first prize for plain sewing was obtained by an inmate of the Alms House, and that an extra prize for baby shoes was given to a working blacksmith's daughter, a young woman about eighteen years old. Some good exhibits of native fibre were also to be seen in this class. They gave distinct evidence of great possibilities, but the Council have

no idea as to the labour required or the cost of manufacturing on a large scale for market purposes. Many of the models reached a high standard and were awarded certificates of merit. The dolls were all bad.

CLASS IV—*Oils, Glues, Honey, etc.*—The exhibits in this class were not good with the exception of some crab oil prepared by the Orealla Indians and the honey exhibited by Mr. RICHARDSON. \$73 was offered as prize money, but only some \$40 was awarded by the judges. Mention may be made of the capital observation-hive of working bees shown also by Mr. RICHARDSON. It was one of the most interesting and instructive exhibits on view.

CLASSES V and VI—*General Arts & Manufactures—Cabinet-making, Coopering, Carpentering, Carving, Jewelry, etc.*—In these classes also the exhibits varied from some that were very good to some utter rubbish. For particular mention a low relief carving of the British Coat-of-Arms, done by a workman in the town, comes first. There was a capital reredos by EDWARD FOO, and a sideboard from Messrs. PARK & CUNNINGHAM'S workmen which took the first prize for cabinet-making. There was little or no bamboo work shown, and for several prizes there were no exhibits at all. In many of the subdivisions there was no competition. There was no box of colony wood, only one deal table was entered, and though so many of our people on the coast and rivers depend almost entirely on fishing for their livelihood there was only one fishing seine. There was only one piece of concrete work. It was well done and deservedly obtained the full prize, but the Council think that prizes of \$10 and \$5 ought to have produced

some competition. The cooper work was good but here also more competition was desirable. The Council regret that the Georgetown artizans took so little part in the Exhibition, more especially as Messrs. SPROSTON & CO. were good enough to give all exhibits free carriage. An exhibit of models of Dutch locks by P. ANTHONY of Georgetown, was given an extra prize. His work was beautifully finished. There were several articles exhibited by ladies which reached a high standard of excellence, particularly a leather worked table by a lady of this town, and some wood carving by two young ladies also belonging to New Amsterdam.

CLASS VII—*Sugar, Rum, Molasses, etc.*—The Council offered certificates of merit for sugars and allied products of estates, but the entries were few and of no great merit.

A few of the larger prize winners are here put in :—

Messrs. Park & Cunningham's workmen	...	...	...	...	£ 40
J. P. Murphy, alone	...	...	...	...	23
Mr. and Mrs. Jansen	...	...	...	...	25
Conyers, shoes, &c.	...	...	...	...	15
Junor, fruits, &c.	...	...	...	...	17
Bell, fruits...	...	...	...	...	15
Mrs. Phillis Wood, starches	...	...	...	...	12
Ambo, tailor work...	...	...	...	...	13
Ross, fruit	...	...	...	...	10

In viewing the Exhibition as a whole the Council are well satisfied with the results of this, the first Exhibition held in New Amsterdam in modern times. Though the defects were many and obvious, they were due more to want of knowledge on the part of the people of the nature of an exhibition than to anything else. The agricultural labourer had much to contend with no doubt from an unfavourable season, and there was

some evidence of labour to overcome the natural obstacles, but on the other hand there were many, very many, examples of neglect and want of energy, as well as a disregard of the regulations. This was not an unexpected result, but the non-success of those who did not comply with the rules will, the Council hope, be the beginning of a real advance towards what all so much desire, that is, the habit of fulfilling to the letter what is undertaken. The results of the Exhibition have, however, clearly shown that when the people have once realized that their good is the only thing aimed at, there is a willingness on their part to be led to do their best and take advantage of tuition. The Council believe in the possibility of instructing the people by means of Exhibitions if the work be continued. Holding this opinion they therefore think it would be advisable to conduct another in August or September 1892, if the Royal Agricultural and Commercial Society will continue to support them with the finances as they have so generously done on this occasion.

The abstract of the Cash Account is attached. The generosity of the subscribers has been already mentioned.

The total value of the prizes given was \$1,078 which is almost what the Council promised. Printing and Stationery cost us \$234. Materials nearly \$100, and labour \$154. The item for Band is heavy, but this is perhaps not to be regretted considering the pleasure the music gave. After all the expenses are paid there will remain a balance of \$440 to be used as a nucleus of any other Exhibition that may be held.

TREASURER'S REPORT.

RECEIPTS.

Received from the Royal A. & C. Society	...	\$	814	89	
„ Subscriptions	...	...	988	96	
„ Gate money	...	...	360	66	
„ For sundries sold	...	...	20	00	2,184 51

EXPENDITURE.

Paid for Prizes	...	...	...	\$	1,078	00	
„ Carpenters, Porters, &c.	...	...	...	91	48		
„ Printing and Postages	...	...	...	134	04		
„ Sundries bought from Stores	...	...	...	198	38		
„ Band expenses	...	...	...	158	64		
„ Town Hall: Lighting, &c.	15	00		
„ Clerical assistance	63	00	1,738	54

By Balance in Bank...	...		\$	445	97		
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\$ 2,184 51

The Coins of British Guiana.

By E. A. V. Abraham.

[With Supplementary Notes on Currency by JAS. RODWAY, F.L.S.]

BEFORE 1809 the coins generally used in British Guiana were Spanish, along with the Joes of Portugal ; and sugar, rum and coffee were also used. Now and then some of these coins are dug up in different parts of the colony. About 1748-1787, Danish money was also in circulation and several specimens of these are found in digging out old trenches and foundations.

In 1542-1567 or soon after, there must have been a settlement of Europeans in the Essequibo, as a Ryal of MARY and HENRY of Scotland, was found with other Scotch coins of the same date in making the foundations of the Penal Settlement. They are all in good order. The Ryal has on the obverse MARIA & HENRIC' DEL. GRA. R. & R. SCOTORV in a circle, the arms of Scotland crowned between two leaved thistles; on the reverse EXVRGAT. DEVS & DISSIPENTR. INIMICI EI., in a circle; a palm tree crowned with a lizard creeping up its stem, a scroll in front of the tree inscribed DAT. GLORIA. VIRES. Their preservation shows that they were not merely dropped and found as treasure trove but were carefully put away. They might have been brought by RALEIGH himself.

The Spanish coins were the current coins of the colony. They were of the best silver and when taken in war were melted and converted into English coins. Some of the coins of QUEEN ANNE have the word "Vigo" showing

that they are coined from the Spanish money taken from the Spanish Galleons captured in Vigo Bay 1702 Those of GEORGE I have LIMA. These were made from Spanish money captured by privateers off the coast of Peru. As the capture of Spanish money increased, America turned her eyes to British Guiana and the West Indies for supply of silver for her coinage, and the Spanish pieces were gradually taken away by merchants. This created a dearth of ready money in the colony and to obviate this, the Government cut pieces in the shape of a star, a crescent, and a circle from the dollar pieces, milled the cut out and the space so cut from, and mint-marked the cut out pieces. The cut out parts passed as one shilling, and the remainder still passed as one dollar. The smaller coins were treated in a similar manner. Specimens of these are unique.

The Spanish piece to represent a sixpence was partially cut across in three in the shape of a triangle and when a purchase was made, the purchaser broke a piece off his sixpence and when he had broken three pieces the triangular piece left was a bit. These pieces are called cut-bits, and are of extreme rarity. This did not stop the exportation of coins. The dollar was now cut in five triangular pieces, each representing a quarter of one dollar; so that the Government made 25 cents on each dollar. The cut edges were milled, and the pieces mint-marked. The doubloon and its parts are still in use in the colony at the present day. The joe, double, and $\frac{1}{2}$ joe of Portugal were also used when mint-marked. The Mexican dollar was also used.

In 1809 attention seemed to have been called to the monetary system of the colony, and tokens in the shape

of 3, 2, 1, $\frac{1}{2}$ and $\frac{1}{4}$ guilders were sent out from England. On obverse is COLONIES OF ESSEQUEBO & DEMERARY TOKEN 1809 in a circle, a crown over the figure (3, 2, 1, $\frac{1}{2}$, $\frac{1}{4}$), enclosed by oak leaves; reverse head to right, GEORGIUS III DEI GRATIA. There was no copper coinage, and worn out copper stamped F.D. and known as "dogs" were used; two dogs being equal to 1 $\frac{1}{2}$ d. To obviate this difficulty in 1813, the stiver and half stiver were issued. These are of the same pattern as the other tokens, but on the reverse is GEORGIUS III D.G. REX. All of these issues were milled with a slant right across, except the stiver and half stiver which were milled in the middle of the side of the planchet.

These coins took so well that another issue was determined on, and in 1816, the 3, 2, 1, $\frac{1}{2}$, and $\frac{1}{4}$ guilders were sent out. On the obverse is UNITED COLONY OF DEMERARY & ESSEQUIBO 1816, around the coin the circlet, the crown over the figure enclosed by oak leaves; reverse GEORGIUS III D.G. BRITANNIARUM REX. The guilder bore the familiar 1 guilder mark. There were troops quartered here and the guilder tokens gave some little trouble as to calculation, so in 1822 a special coinage was minted for the West Indian and other Colonies, and specially used by the soldiers. Obverse, shield garnished, coat of arms of Great Britain and Ireland, surmounted by smaller shield with crown and arms of Hanover, GEORGIUS IV D.G. BRITANNIARUM REX. F.D. Reverse COLONIAR BRITAN MONET. 1822. A crown, also an anchor, (II, IV, VIII, or XVI) on each side of anchor. These passed as $\frac{1}{2}$ (II), $\frac{1}{4}$ (IV), $\frac{1}{8}$ (VIII) and $\frac{1}{16}$ (XVI) of a dollar. These are known as kids eyes, bit and a half, maxwell, quart, pictorine, bit and fipence, octorine and quadrine. Several of these were recently dug up at Fort Island and other parts of the colony.

In 1832 a third set of the guilder series was issued. The die was the same, but on reverse is head to right, GULIELMUS IIII D.G. BRITANNIAR REX F.D. Of these there are the 3 and 2 guilders, the last of their kind, the guilder, $\frac{1}{2}$ and $\frac{1}{4}$ guilder. By some mistake the $\frac{1}{4}$ was not brought out until 1833. In 1835 there was another issue of the guilder, $\frac{1}{2}$ and $\frac{1}{4}$ guilder. In 1836 there was an issue with the same reverse as the last issues, but on the obverse, BRITISH GUIANA 1836, crown, "ONE GUILDER" enclosed within oak leaves. This issue composed guilder, $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ guilder, and was the last of the series.*

The Ordinance establishing the legality of the Spanish and Mexican dollars was in vogue up to a short time ago, when a firm imported a large quantity at 80 cents to pay estates' wages at one dollar each. The Banks thought this an innovation and likely to do some harm to commerce, and an Ordinance was passed, obliterating an old land mark, and for ever making them illegal as money. The old Spanish coins were hoarded and splendid specimens are brought to light now and then.

Strange to say that although the colony was essentially Dutch, the only Dutch coins used were the gold ones of the Batavian Republic. There are a few silver ones of the old Republic still here, but I do not think these were

* It may be as well to notice here that the current coinage of the colony consists chiefly of true English coins, together with (1) the British Guiana coins proper, such as the three and two guilders, the guilder (=one shilling and fourpence), and its parts, ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ guilder), which are however gradually becoming scarcer, especially the older issues; (2) the Spanish Doubloon, gold of \$16 (current at \$15 36; (3) American gold coins, at the current rate of \$4 92 per \$5.—ED.

current. There is a stiver marked "I am of good copper" but this was not placed to British Guiana. There is another stiver of 1838 with "Batavia," but as I have never seen one I cannot speak of its genuineness. Of course it must not be forgotten that English money was current in the latter days and also paper currency of 1, 2, 4, 5, and 10 joes of 22 guilders each.

SUPPLEMENTARY NOTES.

The Currency of the three Rivers.—In the seventeenth century accounts were kept in guilders (40c.), Flemish pounds (\$2 40) and rix dollars or pieces of eight (\$1.) The coins of all nations were current, but as there were very few in circulation, produce, and especially sugar, was recognised as legal tender. Even fines of so many thousand pounds of sugar were common. Under the primitive system of the West India Company, there were no shops, and no trade, except through the Company, or with an occasional New England vessel. There was therefore very little necessity for cash, as the Company took produce in exchange for estate's supplies, or else received bills of exchange in payment. To pay the privateers for the ransom of their plantation in 1712, the private planters of Berbice could only raise 956 guilders and 11 stivers in cash, this being all that the colony possessed. Taxes were paid in produce, and complaints were continually made by the Receiver that the sweepings of the coffee logie and the very worst sugar were considered good enough for this purpose.

Paper Money.—From a very early period the assignats of the Company, given in payment of the wages of its servants, were current in Essequibo and Demerara. With these and bills of exchange, nothing further was

very urgently needed. After the conquest by the French in 1782 however, when the Company's paper was no longer available, the necessity for a medium of exchange was much felt. Paper money was therefore issued to the value of 150,000 guilders, stamped with a new seal, L. XVI (for LOUIS the Sixteenth) and the letters E. or D. according as the place of issue was Essequibo or Demerara. The Proclamation was dated February 26th, 1782, and at the same time it was published that the exchange value of the great French crown was *f*3, the Spanish dollar *f*2.15, Portuguese joe *f*22, and the pistole *f*42.

After the two rivers were restored to the Netherlands, the assignats again became available, and were current until the dissolution of the Company, when the want of paper money was again felt. Nothing was done however to supply this want and complaints were frequent of the need of a currency and the scarcity of coin generally. With the arrival of the English in 1796, began a systematic clipping and cutting of different coins, especially joes and dollars, to make small change. In August 1798, the joes were ordered to be stamped and to pass at *f*22, while people had been warned against counterfeit dollars by a Proclamation of March previous.

In 1806, the inconvenience of the want of silver money was so much felt, that the Court of Policy resolved in July, to issue "Goods" to the amount of *f*73,000. These were to be signed by two, three, or four members of the Court as well as the Receiver. Commencing with 4,000 at one guilder, they were of all convenient multiples up to *f*100, of which latter value however only twenty were issued. The Colonial Revenues were the security, and every one was bound to accept them in pay-

ment at full value. At the same time it was ordered that the "Goods" of Berbice, should no longer be legal tender.

This currency was in circulation until the arrival of the Colonial silver tokens in 1810, when it was exchanged for these. A Proclamation was issued on the 6th of February of that year, warning all persons against melting, exporting, counterfeiting, diminishing, or defacing the new coin, on pain of fines and capital, or other punishments, according to the criminal laws. It will be interesting to note that the well-known joe notes, which were current up to the time of the establishment of the two Banks, were adopted on the recommendation of that famous patron of science, Sir JOSEPH BANKS. Having been consulted by persons interested in the colony, he drew up a plan for the issue of paper money, which was published here in 1809 and finally adopted. The bullion was to be entrusted to the Colonial Agent, to be invested in English Government securities, after which, the legislature was to pass an Act vesting it in Commissioners, as an inalienable deposit destined to support the circulation of the paper. The amount in circulation and the state of the fund was to be published annually and proper rules adopted to regulate the issue and prevent it from too much exceeding the value of the vested fund. By doing this, the circulation would be converted from an unproductive medium of commerce, to a productive deposit, and the interest and compound interest would form a fund which would accumulate and be a source of revenue.

To carry out this project all the defaced, filed and plugged coins were called in, and deposit receipts given, which passed current for some little time until

the notes were issued. The bullion, which consisted of a strange jumble of old and new coins of all nations, more interesting to a collector than to a merchant, was finally shipped to England and sold. The proceeds were invested as proposed, and formed a guarantee fund for the joe notes.

*Papers relating to the early History of Barbados.**

Annotated by N. Darnell Davis.



S the papers following speak for themselves, it will not be necessary to do more than to introduce a foot-note here and there for the purpose of elucidation.

(Rawlinson MSS., C. 94, in the Bodleian.)

JOHN POWELL of Ratcliffe in Stepney Parish, Mariner, maketh oath and saith : That he did credibly heare and doth verily believe that in the year 1625, Sir WILLIAM COURTEN, Knt., of London, deceased, did furnish and send to sea, the shippe *William*, alias *John*, alias *William and John*, JOHN POWELL, Senior, Commander, with men and provisions, to plant and possess for him the said Sir WILLIAM, the Island of Barbadoes in the West Indies, but some accident at sea did frustrate their interest and caused them to returne†. And the said Sir WILLIAM afterwards sent out the said shippe *John*, Captain HENRY POWELL, Commander, where he this said JOHN POWELL went, and in February 1626,‡ they landed upon the said Island Barbadoes (then vacante, without

* These hitherto unpublished papers, relating to the early History of Barbados, have been kindly placed in my hands by Mr. N. Darnell Davis, who has also appended elucidatory foot-notes when necessary.—ED.

† Probably this was the origin of the mistake as to the date of the first settling of Barbados, which is sometimes erroneously given as 1625.

‡ O.S., 1627, in the New Style.

house or inhabitante), about 50 men well provided to possess, plant, and inhabite, the same for Sir WILLIAM COURTEN; and, having so done, he this said JOHN POWELL, went likewise in the said shippe *John* to Disakeebie, neere Surinam, upon the Coast of Guyana, and brought from thence about 32 Indians. And returning from thence, againe to the said Island, 1627, in May, they found the shippe *Peter* and pinnace *Thomasine* there arrived (Captain JOHN POWELL, Senior, aforesaid, Commander), whoe had landed about 80 men and women more upon the said Island, for the said WILLIAM COURTEN, our very worthye and vigorous imployer and provider, supplier, and paymaster. And having begun several plantations there, we left the said Island and went to the Leeward Islands; and, afterwards, the aforesaid two brothers, JOHN and HENRY POWELL, Commanders, having changed shippes at sea, we came for London. And the said Sir WILLIAM COURTEN being exceedingly encouraged with the good report and hopefulness of the said Ilande, did furnish and fit us out againe with all expedition in the said shippe *Peter*, with about 80 men and women more, and we landed them upon the said Ilande in 1628, although with some trouble and opposition caused chieflie by one CHARLES WOLVERSTON, who had imprisoned the Governor, JOHN POWELL, junior, and taken the Government upon himself. And when we had again reduced and settled the people in their due obedience to Sir WILLIAM COURTEN, we brought the said WOLVERSTON and one DEANE prisoners, to London. All which ye aforesaid premises, he the said JOHN POWELL (being constantly imployed therein for the said Sir WILLIAM COURTEN) doth well remember and certainly

know the same to be the truth and nothing but the truth.

JOHN POWELL,* sworne ye 30th day of October 1660,
before me one of the Masters of the Chancery in Ordinary. WILLIAM GLASCOCK.

(Rawlinson MSS., C. 94, in the Bodleian.)

The humble petition of Captain HENRY POWELL,
To the Right Honourable DANIEL SEARLE, Governor
of the Island of Barbadoes, and to the Wor-
shippful Counsell the Assemblie of the said
Island, your petitioner doth humbly show:—

That in the year 1626, being warres between the Kingdoms of England and Spaine, your petitioner having procured a Commission against the State of the Spaniards, your petitioner was set forth of London at the proper cost and charge of five brethren, vizt., Sir WILLIAM COURTEN, Sir PETER COURTEN, Mr. JOHN MOTIFYE, Captain JOHN POWELL and Captain HENRY POWELL being partners in the said voyage. Your petitioner in the month of February in the aforesaid yeare took possession of this Island Barbadoes, and settled heere 40 men, or more, and left my brother's son, JOHN POWELL, Governor; and, having left the aforesaid servants upon this Island, I proceeded in my voyage to the Mayne, to the river of Disacaba, and there I left 8 men, and left them a cargezon of trade for that place. And I traded with the Indians of the aforesaid Mayne for all things that was to be gotten for the planting of this Island of the Barbadoes. And coming down the river of Disacaba, there was three cannoes with Indians of the people

* This John Powell was probably a nephew of Captains John and Henry Powell, and a cousin of the Governor, John Poweell, Junior.

that I had trade with, followed me to the river's mouth and upon a small Island at the river's mouth went ashore, a little before night, faire by the shippe, and had a desire to speake with me. I went ashore to them, and lay that night upon the Island to know their intent to follow me soe farre. Their answer was that they did perceive by ye things that I had bought of them that I was bound to plante an Island that lay to the Northward of them and that they had relation from their forefathers that had been upon an Island that way that was not inhabited, and they described the name of the Island to me. And that they had a desire to goe with me as free people to manure those fruits, and that I should allow them a piece of land, the which I did, and they would manure those fruits, and bring up their children to Christianitie, and that we might drive a constant trade between the Island and the Mayne: for there was manie more of the Indians of that place, that had a desire for to come for that Island, the next yeare, if I would come there againe. And some of them that I brought were the wives and children of men that tarried behind, and sent their wives and children with me. And I had gone againe for that place, but the alteration of the Government of this Island was the occasion of the hindrance of my proceedings, and that I came not to this Island in twentye yeares.

Therefore, my petition is to the Right Honourable the Governor and the Worshipful Counsell ye Assemblie of this Island, that they would take the petitioner's humble sute into consideration, and to set these poor people free, that have been kept thus long in Bondage, whereas I left them here free people, but the former

Government of this Island hath taken them by force and made them slaves, therefore my desire is you would be pleased to make them free people.

Your petitioner shall humble pray.*

HENRY POWELL.

The names of the Indians :

YON, a woman and her three children.

BARBADOES, a boy living at Colonel ELLISES.

(Trinity College, Dublin, MSS., G. 14, 15).

HENRY POWELL'S EXAMINACION.

HENRY POWELL of Limehouse in the County of Middlesex Mariner, sworne and Examined the five and twentieth day of february 1656, upon his oath saith, that on or aboute the 20th day of February 1626† this Deponent being Captaine of the good ship called the *William and John* of London, with aboute 40 other persons in the said Island of the Barbadoes, where there were noe Inhabitants or Natives or any possessor thereof, And saith that this Deponent was Employed by WILLIAM COURTEENE Knight and Company to take the possession of the said Island, and to Land the said Company as aforesaid, and that hee continued in the said Iland for the space of aboute a fortnight, and built houses, and left there at his departure 40 persons and upwards to keepe the possession of the said Iland for the use of the said WILLIAM COURTEENE and Company, and saith that at the end of the said fortnights

* This Memorial is undated. It was apparently written in, or about, the year 1648.

† 1627, New Style.

tyme this Deponent sailed to the Maine upon the Coast of Guiana, and furnished himselfe with rootes, plants, fowles, tobacco seeds, sugger canes and other matterials, together with thirty two Indians which hee carried to the said Iland for the Planting thereof : which said rootes, plants and other matterials were the first that were ever planted there : and this Deponent further saith that within 48 houres or thereabouts after this Deponents said returne from the Maine with the said matterials, and this Deponents Brother JOHN POWELL came from England in the shipp called the *Peter*, with a pinace called the *Tomasine*, wherein were betweene 50 and 60 men with severall materials for the further planting of the said Iland for the use aforesaid, which said persons suddenly built a forte upon the said Island, called the Plantacion forte. And this Deponent further saith that about Aprill 1628, there was a letter sent from the Earle of Carlile, directed to Captaine JOHN POWELL, the younger and Captaine WILLIAM DEANE in Barbadoes and others entreating them to give entertainment and respect to Captaine CHARLES WOLVERSTON, whom hee had sent thither with men to joine with them in the Plantacion, the said Earle ingaging himselfe in the said letter that the said WOLVERSTON, or men, should not give any occasion of offence or trouble or prejudice them in their said Plantacion or profit, or to the same effect. And this Deponent further saith that they, suspecting noe prejudice, did entertaine the said Captaine WOLVERSTON, and aboute 40 men : but, very shortly after, the said WOLVERSTON, by collour of the said letter, did by fraudulent and underhand dealing, and by seducing the said people in the said Iland, tooke the said JOHN

POWELL the younger, and divers other that would not adheare unto him, and put them in prison, and kept them there prisoners and tooke the said fforte, and the Government of the said Iland to himselfe, under the said Earle of Carlile, by cullor of the letter aforesaid, and this Deponent further saith that, afterwards, in the year 1629, or thereabouts, this Deponent was againe imployed by the said Sir WM. COORTEENE and company to carry aboute fourescore or a 100 men, with Armes, to the said Iland, which hee did accordingly in the shipp called the *Peter and John*, and, coming to the said Island, and finding the said JOHN POWELL the Governor and others imprisoned, procured the said JOHN POWELL to be brought aboard this Deponent's said shipp, and then presently landed his, this Deponent's, said men, who went with their musketts and took the said fforte, and seized upon the said WOLVERSTON prisoner, and brought him to London, which hee soe did by vertue of a warrant under the hand and seale of PHILLIPP, Earle of Pembroke, who had a graunt from the King under the greatesseale of England, for the use of the said Sir WILLIAM COORTEENE and Company. And this Deponent did, at the same time, leave the said JOHN POWELL, Governor of the said Iland againe by vertue of the warrant; and, accordingly, the said JOHN POWELL and Company kept the possession of the said Iland, for the use of the said Sir WILLIAM COURTEEN and Company untill, aboute six monethes after, one HENRY HAWLEY arrived at the said Iland in a shipp called the *Carlile*, with men, and invited the said JOHN POWELL, the Governor, with others, aboard his said shipp, to an entertainment, and when they were there tooke them

prisoners, and carried them to the Iland of St. Christophers, and thereupon the said Iland of Barbadoes was seized for the use of the said Earle of Carlile, and hath been ever since kept from the said Sir WILLIAM COURTEEN and Company. And this Deponent further saith, that this Deponent was called to, and was present at, the making upp of the accompt of the disbursements by the said WILLIAM COURTEEN and Company, concerning the Barbadoes Iland mencioned in the deposicion of JOHN MOONE, Merchant, before the Commissioners, this present day, which accompt did amount unto the summe of betweene eleaven and twelve thousand pounds.

HENRY POWELL.

(Trinity College, Dublin, MSS., G. 4, 15).

THOMAS PARRIS, HIS EXAMINATION.

THOMAS PARRIS of London, merchant, sworne and Examined the 16th day of March 1656, upon his oath saith that, in or aboute the moneth of July 1628, this Deponent arrived in the Iland of the Barbadoes in a shipp called the *Long and Costly*, one Irish, Commander, in which said Iland one POWELL, being then and there, had planted two plantacions, the one called the Corne Plantacion, and the other called the fforte Plantacion, and the said plantacions being settled by the said POWELL, as Agent for Sir WILLIAM COURTEEN Knt. and one Mr. MONSE, as this Deponent then heard. And this Deponent further saith that this Deponent being arrived in Barbadoes aforesaid, haveing brought thither severall servants, did there settle another plantacion. And this Deponent further saith that one Captaine CHARLES WOLVERSTON ariving in Barbadoes aforesaid,


did assume unto himselfe to bee Governor, under pretence of the Earle of Carlile of the said Iland, and then tooke Captaine JOHN POWELL, this Deponent, and severall others, Prisoners, and put them in Prison, and tooke the said forte, and the Government of the said Iland to himselfe under the said Earle of Carlile: and that (sic), in or aboute the yeare 1629, one Captaine HENRY POWELL arrived in the said Iland with a Comission from the Earle of Pembroke, then Lord CHAMBERLINE, to make the said JOHN POWELL then Governor of the said Iland; and, finding the said JOHN POWELL, this Deponent, and others, Imprisoned as aforesaid, the said JOHN POWELL this Deponent and others went aboard the said HENRY POWELL'S shipp, and landed the said HENRY POWELL'S men in the said Iland, who found the said WOLVERSTON and one DEANE and others in the said forte, tooke them Prisoners, and sent them away Prisoners in a shipp from the said Iland: and that, by vertue of the said Commission from the said Earle of Pembroke, graunted him from the then King CHARLES, under the greate seale of England, the said HENRY POWELL settled the said JOHN POWELL Governor of the said Iland. And this Deponent further saith that six monethes after, or thereabouts, one HENRY HAWLEY arrived in the said Iland in a shipp called the *Carlile* with severall men, with a power from the said Earl of Carlile; but the said HAWLEY had not admittance to Land in the said Iland, as Governor for Carlile: and afterwards there was a Parly betweene the said Governor JOHN POWELL and his Councill and the said HENRY HAWLEY, and after the said Parly the said HAWLEY invited the said JOHN POWELL and others to an enter-

tainment aboard the said shipp, and, when they were there, the said HAWLEY tooke them Prisoners and carried the said JOHN POWELL and others from the said Iland of Barbadoes, and thereupon the said Iland was settled for the use of the said Earle of Carlile by the said HENRY HAWLEY.

THOMAS PARRIS.

The Nests and Eggs of some common Guiana Birds.

By H. Lloyd Price.

 O one interested in nest and egg collecting, British Guiana offers a wide field, especially to those who reside chiefly in the country districts.

In some parts birds abound, while in others comparatively few are to be seen; probably owing to the presence or lack of low bush, which almost all the small birds seem to prefer for nesting purposes.

One of the most common of birds, and certainly the first to be noticed, is a brown and yellow Tyrant-shrike called the keskeedie (*Pitangus sulphuratus*), a fierce and bold little fellow, who is constantly to be seen flying round, and even attacking the numerous hawks and vultures, when they approach too near his dwelling. The nest of this bird is an untidy-looking object, built of dry grasses, and always placed in a conspicuous position; sometimes in a low bush close to the ground; at others on the branch of a high tree. The entrance is at the side, and the eggs, three in number, are of a creamy white, spotted with grey and brown, chiefly at the round end.

A smaller species very like the above, builds a similar nest, but always low down. The three eggs are creamy white, spotted with red-brown.

A third kind of a grey colour, with a pale yellowish breast (*Tyrannus melancholicus*?) makes a small round nest of dry sticks, lined with grass, generally

found in the upper branches of low trees; the same number of eggs are laid, which are white, thickly spotted with red-brown and grey.

Almost as plentiful as the keskeedies, are the handsome black and yellow plantain-birds (*Icterus xanthornus*), whose purse-shaped nests will be seen hanging from the branches of many low trees. The eggs, three in number, are of a bluish white, spotted and streaked with black, and not unlike the English yellow-hammer.

Similar nests to those of the plantain-bird will occasionally be seen suspended from the ends of the branches of high trees, often the cocoanut, and cabbage palms. These are the nests of the bunyah (*Ostinops decumanus*). They are made of dry grass and cocoanut fibre, interwoven with dry sticks, and are about five feet long. A quantity of dry leaves are placed at the bottom of the nest, in which the eggs are completely hidden. The entrance is a small hole near the top. The eggs two in number are white, thickly streaked and blotched with pink.

Another species makes the same kind of nest; but the eggs are white, spotted with black.

The black and yellow so-called mocking-bird (*Cassicus persicus*), also builds a nest of the same shape and materials, but considerably shorter. It is curious, but in this nest, two totally different kinds of eggs, both in size and colour, are almost always to be found. The larger kind is blue, spotted with black; the other barely half the size is white, spotted with red-brown. The shell of the latter is remarkably thin. Both the mocking-bird, and the bunyah build in colonies, twenty and thirty nests, often hanging from same tree.

A very small grey and white bird also builds a purse-shaped nest made of dry grass, closed at the top, and the entrance close to the bottom.

In the thick pimpler bushes, the nest of the old witch or jumby bird (*Crotophaga ani*) may be found composed of dry sticks, loosely put together. Several of these birds make use of the same nest, ten to fourteen eggs being frequently found. The eggs when laid are covered with a loose chalky substance, like fine powder, but when this is scraped off, they are of a beautiful blue, which, however, quickly fades when subjected to a strong light. Another and much larger species of this bird, called the king-witch (*Crotophaga major*), is sometimes met with. These birds are of a beautiful metallic bluish-black and green colour. The nest is built in the densest bush, and is not often found. The eggs when scraped are of the same rich blue. These birds have a curiously shaped bill, somewhat like the keel of a boat.

Numbers of light bluish birds will be seen flitting from tree to tree especially in gardens, these are the blue sackies (*Tanagra episcopus*). The nests made of small sticks, pieces of cane trash etc., and lined with dry grass, may be found hidden in the leaves of many low trees; the eggs usually three in number, are of a greyish white, spotted with different shades of brown. Another species of a reddish colour (*Rhamphocælus jacapa*), builds its nest in low bushes, close to the ground, and of much the same materials. The two eggs are of a pinkish white, spotted, and blotched with purple-black. A third kind of a grey colour (*Tanagra palmarum*), builds in the cocoanut trees a nest of dry sticks; the eggs are greyish white, spotted with black.

In low bushes, especially when they hang over water, the little black and white silk cotton bird (*Fluvicola pica*), builds a dome-shaped nest of dry pimpler sticks and lays three eggs, which are white, faintly spotted with red.

Another nest of dry pimpler sticks is that of a small brown bird commonly called the rutee (*Synallaxis cinnamomea*). The nest is tunnel-shaped, and exceedingly large for the size of the bird, and may be found almost everywhere. The eggs are of a dull white.

Various species of small finches or grass birds (*Spermophila, etc.*), build tiny nests in the long grass growing at the sides of trenches, they are generally made of dry grass, and occasionally of dry sticks. The eggs, two in number, are of a greyish white spotted with either red, brown or grey, and of various sizes. A small black bird with a white head will frequently be observed among the grass birds; this is not inappropriately called the parson bird (*Arundinicola leucocephala*).

The dainty little nests of the common green species of humming-birds (*Agyrtria, sp.*), may be found fastened to the small branches of bamboos and other low trees. The two eggs are pure white. Another and very beautiful species, called the king humming-bird (*Topasa pella*), is fairly common in parts, especially in some of the smaller creeks, where the nests, made of a soft yellow spongy substance, will be seen fastened to the vines and creepers which overhang the water. The eggs are like the former, white.

In the long reeds and bulrushes common in the trenches of abandoned cane fields, a small but handsome bird builds. This is sometimes called the reed bird.

The male is black with a light orange head ; the female of a greenish grey colour (*Xanthosomus icterocephalus*). The nest, composed of dry cane trash and grass, is fastened to the reeds by its sides, generally nearly the top ; the eggs three in number are pale blue, spotted with black. In this nest as well as in the nest of the silk cotton and other small birds will be sometimes found the egg of a species of bird having the habits of the common cuckoo, commonly called by the creoles the lazy bird (*Molothrus atronitens*). The egg is greyish white, thickly spotted with red-brown.*

The nest of the chough or shypook (*Ardea cyanura*), will be frequently met with in low thick bushes near the water ; it is ridiculously small for the size of the bird, and is simply a few dry sticks put together. The two eggs are a very pale blue, and quickly fade.

At the bottom of bushes will be found at times, the nests of several species of bush and water fowls. The eggs which vary in number and size are light brown, spotted with darker brown and grey. In open pasture lands the colonial red-breast (*Leistes guianensis*) builds on the ground. The male is a handsome brownish bird with a light scarlet breast, the female a dull brown ; the eggs are of a brownish-white speckled with light red.

In newly cut cane fields the common species of black vulture (*Cathartes atratus*) lays her two eggs which are often found on the trash banks, and near the roots of old stumps. The eggs are of a dirty white, profusely

* In the towns and inhabited districts, the most common victim of this lazy-bird is, however, the common tiny wren (*Troglodytes furvus*).
—ED.

spotted with dark brown. The young of this bird are seldom seen ; they are of a light bluish or brownish grey colour.

Other birds nesting on the ground are the pretty grey and white ground pigeon (*Engyptila rufaxilla*) whose eggs of a light salmon colour spotted with light brown, may be occasionally found at the roots of small trees and bushes ; also the small ground dove (*Chamæpelis*, sp.) several species of night-jar (*Caprimulgidæ*), beside other birds. The ground dove occasionally builds a nest of sticks in low trees, the two eggs are white.

A small wren of a brownish red colour (*Troglodytes furvus*) is frequently to be seen, especially near inhabited houses, under the rafters of which it builds a nest of dry sticks ; the eggs are brownish white closely speckled with red. This bird has a pleasant warble very uncommon amongst the colonial birds.

Several varieties of kingfisher, one a large handsome greyish blue bird (*Ceryle torquata*) dart up and down the numerous trenches, and waterways, and are plentiful in the small creeks ; the eggs of a glossy white are laid in holes in the bank.

A large black and white woodpecker with a scarlet crest, called by the creoles the carpenter bird (*Dryocopus lineatus*) will attract attention. Another species, of an orange colour, the wings bordered with brick-red, and a brick-red tail is also a very striking-looking bird (*Celeus sp.*) ; these with several other smaller species lay their eggs in holes in trees. The noise these birds make while searching for insects by tapping the trunk and branches of dry trees is, when first heard, quite startling, and can be noticed a great distance away.

Hawks abound, and numerous species of these fine and powerful birds will be seen. The nests are not easy to find, and when found, are difficult to get at. One species of a reddish brown colour (*Buteogallus æquinoctialis?*) builds its nest in the forked branches of the courida trees. The nest is a heap of dry sticks, a few green leaves on which the solitary egg is laid, are placed at the bottom. These hawks are very partial to crabs, and may frequently be observed catching them on the mud flats. This may account for the state of the egg when found, which is always covered with a thick coating of mud, probably caused by the dirty feet of the bird turning it in the nest. The egg after it is washed, is of a dirty white colour, blotched with red-brown.

Another species of a dirty brown and white colour, builds a similar nest in the cocoanut trees, and lays two eggs of a brownish red. A third and much smaller species of a grey colour (*Asturina magnirostris?*) also frequents the courida trees, and builds in the highest branches. The nest is very small for the size of the bird, and like that of all hawks, built of sticks. The two eggs are white, spotted with red-brown.

A large black and white hawk, (*Urubitinga sonura?*) may sometimes be noticed; this species builds in high trees, and lays one egg. The beautiful blue and white scissors-tail hawk (*Elanoides furcatus*) may also be occasionally seen hovering high up in the air. The nest is built in the high branches of the lofty mora trees, and the two eggs are of a glossy white.


In the canals and trenches and almost in the water itself, the eggs of the spur-wing (*Parra jacana*) are found, usually on a thick mass of water-weed; the eggs

are generally four in number, and of an olive brown, spotted and streaked with black. The eggs of two species of maam may occasionally be obtained, the large kind (*Tinamus sub-cristatus*) lays ten or twelve eggs which are quite round and of a deep blue, the smaller (*Crypturus variegatus*) lays but two eggs of a chocolate colour.

Of course many other birds will be frequently noticed and the nests and eggs obtained ; but those I have attempted to describe are among the most common, and will be the earliest to attract the attention of the collector.

The Native Birds of Georgetown.

By the Editor.

EORGETOWN offers a by no means uninteresting field to the ornithologist. Owing to its large extent and the marked abundance of plants of all sorts and sizes, in all parts of the town—due especially to the existence of large public and private gardens, thickly stocked with a tropical luxuriance of dense creepers, bushy flowering shrubs and tall palms and other trees, the greater proportion of which are of considerable size, together with open grassy spaces and wide streets lined or divided with wide trenches of water and dotted with trees, and to the proximity of large tracts of uncleared bushy land, there is afforded not only most perfect shelter and protection for the growth and multiplication of the feathered races, but most ample opportunities for their procuring constant supplies of fruits and insects and other animal and vegetable food.

Of the total number of birds recorded from the colony (nearly 700 distinct species) about one-seventh may be obtained in or about the neighbourhood of the town, though not a few of these are only met with at rare intervals, and then only on the outskirts, or are seen flying overhead.

As would naturally be expected, the normal residents, with the exception of the carrion-feeding species, are chiefly birds of small size; and to a large extent they represent the typical families of the great group of the Passerine or perching birds, a very great many of which

are broadly characteristic of this zoological district only. By means of a study of such forms, one is thus enabled to become familiarised with the chief of those large specialised groups distributed over the districts of tropical America.

As is already widely recognised, there are to be found widely scattered over the various parts of the colony, and by no means sparsely, some of the most ornate and beautiful of the birds of the world; but our town birds scarcely give an idea even of such excellence, though a few of them are by no means wanting in beauty of coloration. Of such may be mentioned the various species of humming-birds, the grass canaries (*Sycalis* sp.), the bastard canaries or louis d'or (*Euphonia* sp.) the blue and cashew sackies (*Tanagra* and *Ramphocælus*), the so-called robin redbreasts (*Leistes*), the yellow-plantain birds (*Icterus*), and the swallows (*Progne* sp.), while many others, though not brilliant, are yet sufficiently pleasing in appearance.

While there is this marked disproportion, however, between the town and forest birds as regards their colouring, there is little difference to note between them as regards their song. In and about town, the mellow notes of the thrush, and the brilliant warbling of the wren can be heard to as great, if not greater, advantage, than in the country districts generally, while the pleasing twittering and whistling of many of the small birds, such as grass canaries, and the grass birds and other finches, are perhaps quite as distinctive.

With perhaps the exception, of the persistent and loud-voiced "kiskadee," of an assemblage of the common tyrant shrikes, there is nothing to be heard in

town that can fitly be compared with the cries of birds in the forests, where macaws, parrots, bill-birds, bultatas, quow-birds and other cotingas and loud-voiced species, produce a perfectly astonishing depth and variety of sound, that, but for the deadening influence of the forest, would be in the highest degree harsh and discordant.

There is here, in comparison with the northern temperate districts of the Old World, a marked paucity of the birds of song, due to the fact that there are but few representatives of those special groups that furnish the chief singing birds (*Acromyodi*) of the Old World; while in the species of many of those great characteristic groups that comprise the most distinctive of our birds, the essential structure of the vocal organs renders them destitute of the power of song (*Mesomyodi*) though they are capable of giving expression to various cries so loud and unique, as to render them unmatched among their kind.

In the following preliminary account of the most common of our town birds, an attempt has been made to give not only the zoological names of the species, with their alliances, and the special characters by which they may be determined, but also the various local names by which they are known. This, however, is an altogether unsatisfactory feature in their history, since the names are by no means generally known, nor are they, in a variety of cases, at all distinctive of particular birds. Thus such names as grass-birds, canary, kiskadee, chicken-hawk, etc., are, in each case, applied to many totally distinct birds, which, having certain resemblances either in their habitats, colour, cry or habits, are popularly grouped together.

It may very likely be that in describing the ordinary birds of the town, some of the smaller species have been omitted. The difficulty in dealing with these is considerable, since from their size it is not easy to be certain of the species when they are seen among the trees, and the difficulty of procuring them among the gardens of the city is one that, under the conditions of the case, can scarcely be met. In a good many cases, too, the nesting and eggs of the birds have not been observed; but in the preceding paper by Mr. LLOYD PRICE much of this information will be found relating to the commoner kinds.

In enumerating the various forms, some simple character, such as colour, might be used more easily to help fix the identity of any given individual, but with its simplicity, there would be the serious drawback of wrenching apart closely allied species; and a plan of relationship will therefore be taken by means of which some general idea as to classification may be attained.

The great group of the Passerine or Perching Birds (*Passeres*) includes the greater number of our town forms, among which the thrushes, wrens, swallows, tanagers, finches, hangnests and tyrant shrikes, are some of the commonest of all. The thrushes, of which about a dozen species are to be found in different parts of the colony, are represented by three species, two of which (*Turdus phæopygus* and *T. albiventris*) are extremely common, while the third (*T. fumigatus*) is only occasionally seen. Of the former, the first mentioned or white-throated thrush, which is perhaps the smallest and most widely distributed in the colony, is readily recognised by its dull brown colour above, pale

slaty-grey passing into pure white below, and the brown-spotted throat marked by a conspicuous white patch; while in the second, or white-bellied thrush, the upper surface is of a rusty brown, the under parts pale brownish white passing into pure white behind, and the brown-spotted throat destitute of the white patch. In the third or Sabian thrush, the colour is of an ochraceous brown throughout, darker above and lighter below, passing into a white tint in the centre of the body.

The notes of our common thrushes are mellow, full and well-sustained, and on this account the birds are popularly regarded by the resident Europeans as identical with the song thrush of the Old World (*T. musicus*) whose notes, however, are considerably more sustained than in our local species. There is a marked difference, moreover, in the plumage of the song thrush, whose cheeks, throat, breast and flanks are thickly spotted, while in the local forms, the spotting is confined to the throat.

It appears from information that has been derived from various sources, whose trustworthiness I have no reason to doubt, that the song thrush has been introduced into the colony from England on many different occasions; but certainly it seems not to have flourished, for not a single authentic instance of its occurrence at the present time has been brought to light.

The common town thrushes are to be found, at almost any time, in the Promenade and Botanic Gardens, and in the large private gardens, where they will be seen amongst the foliage or on the ground searching for fruits, seeds and insects. Here they are also frequently heard, though in my own experience never to such ad-

vantage as among the trees on the outskirts of the city.

The true thrushes will readily be distinguished from all other birds by the characters of their bill and wings. The former are slender and rather long, wide and depressed, and the latter long and flattened and composed of 10 primary quills. The only birds with which they might be confused are two mocking thrushes, which however are not found about the town, the one, *Mimus gilvus*, a larger bird, being found hitherto only in the high lands of the interior, and the other, *Donacobius atricapillus*, commonly known as fantail, ground powis, and pompadour, being found very commonly among the high grass and low bush, chiefly in swampy districts near the coast. Both of these birds, may, however, be easily distinguished by the form of the wings, which are short and rounded, while the colour in each case is equally distinctive—seen particularly in their tails where the centre feathers are tipped with white, and the others with the white increasing as the outermost feathers are reached.

Throughout the town, in the gardens and in the galleries of the houses, the little warbling wrens are to be heard at all times of the year and at all hours of the day. This little bird (*Troglodytes furvus*) is about 4 inches in length, of a dull and ruddy brown, with the feathers of the wings and tail closely barred with darker brown, and with the throat, breast and belly dull white passing into a browner colour at the sides. They are fearless little things, jumping about the window-sills, peering into nooks and crannies careless of the presence of man, and enlivening and cheering with their melodious warblings. They build their little nests in all sorts of places—in the galleries, in the bed-rooms, under the

house, along ledges, under the eaves, within empty flower pots, inside old pipes, and in other odd situations, often approached by apertures to be passed only by small objects like themselves.

Unfortunately, as a race, they are subjected to the parasitic nesting habits of the Icterine lazy-birds (*Molothrus atro-nitens*), which are often to be seen spying out the homes of the wrens; and the little creatures in finding out places inaccessible to the larger bodied lazy-birds often seem to be all alive to the risks of careless building. When the eggs of the parasite are once deposited, the destruction of the brood of wrens is secured, the lazy-birds hatching sooner than the young wrens and causing their displacement.

The solicitude of the parent wrens for their forced foster-children is almost painful to witness, the large and voracious chicks being at any time but merely excited by the small quantities of food brought, quantities that would be all sufficient for little-bodied wrens. The little foster-parents are thus kept constantly on the move, seeking for moths, spiders and small insects generally, while the appealing cry of the young lazy-bird is a constant incentive to fresh efforts.

Another species of wren, a much larger one (somewhat more than 5 inches in length) is occasionally to be seen, but it is much less common than the white-bellied species. This is the black-faced wren (*Thryothorus coraya*), the upper surface of which is of a chestnut colour, with darker wings, and with the tail feathers very distinctly barred, while the cheeks and side face are black, and the under surface of a variable brown tint.

The wrens will readily be distinguished from other birds by their small size, their thin and rather long bills almost destitute of bristles at the gape, their rounded wings, short tail, and strong legs. They are known among the common people by the names "God-bird" and "rain-bird."

The birds now to be mentioned are characterised by having 9 great quill feathers (*primaries*) in the wing, and they are thus known as finch-like birds or fringilliformes, in contra-distinction to the thrush-like birds or turdiformes in which the quills are 10, the first being very short.

Perhaps some of the commonest of our birds are the swallows. Of these there are four species about the city, one or more of which may always be seen flying about overhead or perching on the roofs of the houses and sheds, about the eaves of which they generally make their nests. The commonest is the white-breasted purple swallow (*Progne chalybea*), the whole upper surface of which, in the male, is of a deep purple colour, less so in the female and young birds, passing into grey and white in the under centre. A larger bird, the purple-breasted swallow (about 7.5 inches in length, the former being about 6.6 inches) in which the purple colour is found above and below (*Progne purpurea*) is also found with the preceding, together with a third species of the same genus, in which the purple tints are replaced by brown (*Progne tapera*).

A much smaller bird, swifter and more bat-like on the wing, is often seen sweeping overhead. This is the red-throated swallow (*Stelgidopteryx ruficollis*). A very curious feature in connection with

these birds is the presence, in the males, of a very stiff and roughened outer edge to the first quill of the wing, so that it is distinctly serrated and hard to the touch. They are brown-coloured above, passing into a bright yellow on the under centre, while the throat is of a brick-red.

The swallows are bold and fearless little birds, domineering even over the pugnacious tyrant shrikes or kiskadees. They seem to frequent special houses where by their greater elevation or isolation they are less disturbed; and about these they are found plentifully, chattering and quarrelling with special emphasis at nesting time. They are always to be met with in the river, and generally before heavy rain they are to be seen circling overhead in considerable numbers in the gloomy sky.

The swallows will be easily recognised by their broad, short and thickened bills, their long, pointed wings, and weak feet, characters in which they closely agree, as in habits, with the swifts. They are by their structure, however, widely separated from these birds, as will be seen when the latter group is considered in connection with the humming-birds.

Among the trees with dense foliage, and especially fruit-trees such as the mango, the sapodilla and star-apple, the little flower-peckers (*Certhiola chloropyga*) are always to be found. These are tiny little birds, smaller even than the wrens, and allied to the beautiful blue creepers or sugar-birds (*Cæreba*) so commonly distributed in the forest districts near the open savannahs. The plumage is by no means brilliant, being of a dull ashy-black above, black on the head with

a white eye streak, and yellow on the rump, with a prevailing yellow below, the throat however being grey. The bill is rather long, curved, slender and sharp-pointed.

These little birds are often to be seen hunting for insects among the flowers, and jumping about among the branches of the trees, or feeding on the ripe fruits. Their note is a sharp *tweet*, *pi-pit-tweet*, *pi-pit-tweet*, and on this account they are commonly known as "pipi-toorie," though the same name is also applied to a totally distinct bird, a diminutive tyrant-shrike (*Todirostrum cinereum*,) of much the same size, colour and habits, and almost as common as this little sugar-bird.

Another of this same group of sugar-birds is sometimes to be seen among the trees on the outskirts of the town. This is the blue creeper (*Dacnis cayana*), whose habits closely resemble those of the preceding bird. It will be recognised by its light but bright blue colour in the males, the upper part of the neck, the wings, tail and gorget being black; while in the females the colour is of a bright green, the head being blue. The bill in these birds, for the family, is rather short and thickened, and is sharply pointed.

The family of American creepers, otherwise called sugar-birds and flower-peckers, though similar in their habits to the Old World or true creepers (*Certhidæ*), are very different in appearance, due chiefly to the absence of the spiny tail. Some of the most beautiful of birds are forms of this group. In many characters they closely resemble the American warblers, from which however, they differ in possessing a fissured or pencilled tongue. They agree with these, however, in being fringilliformes, that is, destitute of the first shortened quill,

while the Old World representatives of both groups are turdiformes.

One of the commonest city birds is a typical representative of the American warblers. This is the yellow summer bird of the United States (*Dendroica æstiva*), known also as the golden warbler, and locally called canary. They are migrants in the United States, but certain it is that they are to be found about Georgetown all the year round, among the low bushes and high trees. Here they are shy birds, and are with difficulty snared by those who make a practice of caging the song birds.

They are about 4 inches in length, and will easily be recognised by the bright yellow colour above and below in the males, inclining to orange on the head, and with a slight rusty-red tinge on the crown, and with deep rusty-red stripes down the breast and belly, while the wings and tail are brownish with yellow edgings. In the females, the yellow is paler, and a greenish tinge colours it above, while the red stripes are only indicated on the belly. The bill is rather long and thin, and rather wide and depressed.

Among some of the commonest of the town birds, and at the same time one of the most beautiful, is the Tanagrine bird, commonly known to colonists as the cashew sackie (*Rhamphocælus jacapa*). This bird is known under various common names in different parts of the colony, such as wasoo, buck-town sackie, silver-beak, red sackie, etc., while it has been referred to by black creoles as "white-bill black-bird with a wine breast." It may be taken as a type of the large family of the *Tanagridæ*, whose more than three hundred species are entirely confined to the New World, and almost entirely to the tropical

parts, where they form some of the most beautiful natural objects to be met with. The members of this family are distinguished from the other singing birds with nine primary quills by the presence of a distinct notch on the upper mandible of the bill, whose form closely approaches that of the true finches, while in many other characters they approach the sugar-birds already described.

This red-breasted tanager is, in the adult male, of a shiny black above with crimson reflections, while the head and neck are of a deep red and the breast of a bright wine red. The under beak is of a pale silvery white, and thickened. They are rather more than six inches in length. The female is of a dull rusty red throughout. They are to be seen in all parts of the town flitting about among the trees, on the fruit and seeds of which they almost entirely subsist. Their note is sharp and shrill and by no means pleasing, with a recurring sound of "sick" nasally pronounced. They are active birds, and are constantly on the move from tree to tree.

Very closely allied to the preceding are the blue tanagers (*Tanagra episcopas*), commonly known as blue sackies, though the name, taken from the note of the bird, can hardly be said to be really imitative of their cry. This bird is of a uniform pale blue colour throughout, with a much shorter and narrower bill than the rather larger cashew sackies. In their habits they very closely resemble that species, though they are considerably more shy, and are seldom to be seen among the house-gardens in the city. About the outskirts of the town, they are fairly numerous, flitting about the various fruit trees and seed-bearing plants.

Another tanager often met with, and very common among the cocoa-nut palms among which they chiefly

make their nests, is the so-called palm sackie (*Tanagra palmarum*). These birds in their habits and diet closely resemble the two preceding species, from which their somewhat greater size, and their coloration, at once readily distinguish them. They are of a nearly uniform ash or pale olive-green colour throughout. Both this bird and the two preceding are frequently snared by boys and kept in cages for sale, though, as song-birds, there is no value to be placed upon them. Among the houses of the native Indians, they are also often to be seen, with their wings trimmed, and wandering at large about the settlement.

Among the shrubs and trees generally throughout the town, a somewhat larger tanager than the preceding, and one which by the size and shape of its bill would commonly be referred to the finches, is always to be met with. This is the tom-pitcher (*Saltator magnus*), whose upper colouring is of an olive-green, the under surface an ashy grey, tinted with yellow, chin white and with a black border on each side. The bill is decidedly thick, swollen and finch-like, but it bears a distinct hook at the tip and is slightly notched.

These birds chiefly frequent the smaller bushes and trees, where they seek out the seeds and fruit. They are also often to be found on the ground. They are restless birds, seldom quite stationary for any length of time, but jumping and jerking about from branch to branch and tree to tree. Their cry is loud and somewhat harsh. They are frequently caught by boys, and though as a rule they thrive fairly well in confinement, they are neither beautiful in plumage, nor melodious in song.

In the plantations on the outskirts of the town, species

of the beautiful tiny louis-d'ors (*Euphonia*) are obtainable; but as their occurrence in town is not based on submitted skins nor on my own observation, there can be no guarantee given of the fact. These birds are known by the name canary and bastard canary, and the commonest are referable to the two species of *Euphonia violacea* and *E. plumbea*. They will readily be known by the shining deep blue colour above and orange-yellow below of the first species, and the ashy-blue above and golden-yellow below of the second form. They are both often snared for cages, and at times are thus to be obtained about the streets in considerable numbers. They are sprightly, active little creatures, about 3 inches or more in length, with short, thickened bills, large heads compared with their bodies, and short tails.

Two other common birds often met with, and like the foregoing known as canary, generally grass canary, are, however, referable to the true finches. These are *Sycalis flaveola* and *S. minor*. They will be recognised at once by their short and thick finch-like bills and their yellow colour. The former is a little more than 5 inches in length, of a bright yellow colour in the male inclining to orange in parts of the front, and with darker olive parts to the wings and tail and the middle of the feathers generally; while in the females, the greener and darker tints predominate on the upper surface, passing into a pale whitish yellow below.

In the second species, which is a much smaller bird (about $4\frac{1}{2}$ inches), the colour is much darker and duller above, the yellow being washed with green and brown in the male, and considerably more so in the female, while the yellow of the under side is clear and bright,

but inclining to whitish brown in the females. In the young birds the colours are duller.

These pretty little birds are often to be seen flying about the bushes and trees in the town, and are commonly found on the high grass stems in open places. They are great favourites as cage birds, and are often to be seen, in the common pith-cages, being hawked about the street.

Closely allied to the preceding are several little finches from three to four inches in length, which as a rule frequent the grassy and bushy wastes, seeking for grain and seeds, and hence are called by the common name, grass-birds, though they are often seen among the trees and upon the ground. They are nearly all referable to the genus *Spermophila*, and will readily be distinguished from the grass canaries by the greater stoutness of the bills, the under mandible being especially enlarged at the base.

In one very common species, *S. minuta*, the entire under surface in the male is of a chestnut colour, while the upper surface is brown, with a slight greenish tinge, except the hinder part of the back which is of a rich chestnut. Some whitish ashy spots are found on the front and tip of the wings. In the females the chestnut is absent, the prevailing colour being brown with traces of a greenish tinge, and pale yellowish and ashy brown below. The young birds are like the adult females, though traces of the chestnut of the adult males soon begin to appear.

In another equally common species, *S. lineata*, the prevailing colour above is bright greenish black in the males, pale behind and somewhat mottled. The feathers of the wings are edged with white, very conspicuous on

the middle of the wing. The cheeks and sides of neck and under surface are white, ashy at the sides of the body, and with a band of black across the neck. The females are greenish brown above, and whitish or yellowish grey-brown below.

Several other species of this large and common genus will be met with, such as *S. lineola* in which the colour above is a greenish black, with a white band on the crown, cheeks and rump, while the throat is black and the abdomen white; and *S. castaneiventris*, blue-grey above, with black wings and tail edged with blue-grey, and with chestnut-coloured throat, breast and abdomen.

As will have been noticed from the foregoing descriptions, the adult males have a very characteristic colouring, by means of which the species will easily be recognised; while the females have a very general similarity in appearance, though the sizes vary a good deal in the different species. As is the case in very many birds, the young males are like the females, though at an early age, they begin to assume their distinctive several characters.

Closely allied to the preceding, but distinguishable at once by their greatly thickened and swollen conical bills and by their greater size, are two species of *Oryzoborus*, known as well by the name grass-bird as by their special names of twa-twa and twa-twa slave. The twa-twa (*O. crassirostris*) is about 5 inches or more in length, and of a glossy black throughout the plumage of the male, with the exception of the axillary feathers of the wing which are white. The bill is swollen like that of a typical hawfinch or grosbeak, and of a pale yellowish

white. The females are olive brown above, and yellowish brown below.

The twa-twa is much prized as a cage bird, and about town they fetch high prices—their whistling and chirping being very sweet and rich. They are frequently seen on the outskirts of the city among the grass and low bush of the open lands, where they feed on various seeds and grains.

In bushy outlying places where the foregoing bird occurs, there will always be found the second but smaller species of the same genus, known as the twa-twa slave (*O. torridus*), which however is much more common in and around the city than the twa-twa. With the exception of some white spots at the base of the quills of the wings, and the chestnut of the breast and abdomen, the plumage is of a glossy black in the male; while the female is dark greenish brown above with a reddish tinge on the hind back, tail and wings, and of a pale reddish brown beneath. In habits this bird closely resembles the preceding finches.

At the back of the Botanic Gardens, along the Lamaha Canal, on the outskirts of the town, the black bunyah (*Ostinops decumanus*) will occasionally be met with. This is a large black bird, with chestnut-coloured rump, and yellow tail, with the two central feathers black. The bill is pale yellowish white and very large, nearly straight and pointed, and with the upper part expanded into a large shield which is continued on to the forehead. It may be taken as a typical member of the hangnests or Icterine family, its nest being several feet in length and purse-shaped, suspended from the ends of branches, generally near or over water. The more than 100 members of this group of

birds are all confined to America, where they take the place of the starlings. They are known by various names, such as cassiques, hangnests, troupials, orioles, etc., and many of them are gifted with great powers of song, while others are imitative to a remarkable degree, such as the common mocking-bird of Guiana (*Cassicus persicus*) which does not occur within the immediate neighbourhood of the city.

In all parts of the town, the common yellow hangnest or plantain bird (*Icterus xanthornus*) will be found flying about among the trees, and their long purse-shaped nests are often to be met with on the outskirts. These are handsome birds, about 7 inches in length, of a bright yellow colour, with a greenish tinge between the black wings, which are distinctly marked with white; the tail and the middle of the throat are also black. The females and young males are much greener and duller in colour. They are often caged on account of the brilliancy of their plumage, though they are much less brilliant than another species, the troupial (*I. croconotus*), common in the interior and much prized as a cage bird both for plumage and song.

Another very common member of this group is the parasitic lazy-bird (*Molothrus atro-nitens*), whose cuckoo-like habits have already been referred to in connection with the commonest of their small victims. This bird is about 7 inches in length, of a deep shining purplish black in the adult males, and brown in the female and young males. They are more commonly found on the outskirts of the town, where the wrens suffer from their loose habits much more than in the town proper. These birds do not make nests of their own, but deposit their

eggs in the nests of smaller birds. It is a curious feature in their Natural History that the parasitic habits of the Old World cuckoos should be found characteristic of this genus of birds while the American cuckoos have normal nesting habits.

In swampy places on the outskirts of the town, but chiefly along the coast, the common small yellow-headed reed-bird (*Xanthosomus icterocephalus*) will generally be found in considerable numbers among the low bush and tall reeds and grasses. The males are, with the exception of the yellow neck and head, of a black colour throughout, while the young males and females are blackish and yellowish brown.

Closely related to the preceding are the so-called robin red-breasts (*Leistes guianensis*), which are found about the outer parts of the town, chiefly in grassy and bushy open places. The adult males are blackish brown, with a rich scarlet throat breast and belly, while the young male and the females are much paler, and with much less scarlet below.

The so-called black-birds (*Quiscalus lugubris*), which are so often to be seen in large flocks in the roads and the open grassy spaces around the town, are also members of the Icterine group, though unlike the typical species, they do not make pendent but flat nests—a character in which they resemble the preceding form. The adult males are about 8 inches in length, and of a bright black throughout, with violet reflections. The females are somewhat smaller and of a duller, browner black. They feed largely on grains, seeds and insects.

So far the species which have been under notice are members of the acromyodian group of the perching

birds, that is, those which from the structure of their vocal organs are known as the singing birds. The remaining mesomyodian perchers, the songless birds, now call for notice. Of these but three families are represented in Georgetown, two each by one species, while the third, that of the tyrant shrikes, comprises many of the commonest of the strictly town perchers.

The family of the tyrant-birds (*Tyrannidæ*) includes in all more than 400 species, and is restricted to the New World where they represent the flycatchers of the Old World. They have wide and depressed incurved bills, hooked or notched at the tip, and abundantly provided with bristles at the base, and their coloration is generally of some shade of green and yellow. One of the most typical, and the commonest about town, is the large kiskadee (*Pitangus sulphuratus*) about 8 inches in length, whose loud, harsh and fierce cry of kis-kis-kiskadee is to be heard at all times of the day and all over the city, though very often they give utterance to a more subdued note like a nasal "tweek."

The prevailing colour of the upper surface is brown, the wings and tail being margined with rusty red, while the feathers of the head are black, covering a black-tipped yellow crest of erectile feathers in the males, and surrounded by a white ring; beneath sulphur-yellow predominates, the throat being white. It is a fierce and cruel bird, having special fondness for the young of other birds as food, taking them from the nest when chance offers. Their diet is a liberal one, since they feed on flesh, fruits, seeds, worms, insects, etc.; and while on the one hand they are of use in gardens as insectivorous creatures, on the other they are nuisances as being

equally destructive to fruits. Of grapes and peppers they are extremely fond and they will often be noticed swallowing large quantities of the fruits. They are markedly quarrelsome and pugnacious, and will never hesitate in attacking and driving away larger birds such as the vultures and hawks, which they often seem to delight in pursuing. The swallows and humming-birds, however, often attack and pursue them, and occasionally when the kiskadees are darting and pecking at a hawk or vulture, a humming-bird may be seen pursuing the tyrant and driving him off.

The name kiskadie is applied to several different species, all of which utter the same cry; but the above large form is the commonest of all about the town. A smaller bird (*Pitangus lictor*) is also very common, and is chiefly distinguishable from the larger bird by its size (about $6\frac{1}{2}$ inches in length) and by the rather greener brown of its plumage. The bill too is much thinner and narrower. Its habits are similar to the larger species.

A third kiskadie (*Megarhynchus pitangua*) is also often met with, commonly among the tamarind trees. This is the largest of all, being about $8\frac{1}{2}$ inches in length. Its colours agree in every respect with those of the common *P. sulphuratus*, but the crest feathers are orange or orange-yellow. It is readily known by its enormously widened and flattened bill, which tends to be almost shovel-shaped.

The cry of this bird is harsher and deeper than the common species, but not so loud and piercing. It is altogether a less fierce and pugnacious bird, and will often be seen perched in the same attitude for long periods.

A fourth kiskadee (*Tyrannus melancholicus*) much about the same size as the commonest species, is also very plentiful about the city. It differs from the others in having the upper surface brownish or greenish grey, with a concealed crest of scarlet and yellow on the top of the head, but with no white ring. The wings and tail are blackish, the former being long and the latter deeply forked; the throat and fore-breast grey or greyish white, and the hind breast and abdomen yellow. This bird is much more active than the preceding form, and is stronger on the wing than *P. sulphuratus* owing to its longer pinions. It is, however, much less lively, noisy and quarrelsome than this common form.

A fifth form of kiskadee (*Myiozetetes cayennensis*) is also fairly common about the city, though chiefly seen on the outlying parts. This is a much smaller bird than any of the others, being about $5\frac{1}{2}$ inches in length, and commonly known as small kiskadee. The markings are almost exactly those of *P. sulphuratus*, except that there is much more of the rusty-red tint on the edges of the wing feathers, which are also a blacker brown. The bill, however, is much shorter, thinner and altogether less strong in proportion.

Among some of the commonest of the birds seen about the streets and gardens of the town are various species of greyish tyrant-birds, with rather small flattened bills, commonly known as muff-birds. These are species of the genus *Elainea*, the several forms of which very closely resemble each other. The two commonest are *E. pagana* and *E. albiceps*, each about 6 inches in length, with a crest of concealed white feathers, which they often erect, and with white edges to the feathers of

the wings so as to form cross bands. The first species is somewhat greyer above than the second, with the belly much more yellowish in tinge.

These birds feed on seeds and insects, but particularly the latter : and when they have secured some tit-bit are often to be seen chased by the kiskadees and compelled to drop the treasure. At such times they erect their crests to great advantage as though with a desire to fight, but they have neither strength nor courage to face their tyrants.

Among the large trees with dense foliage, as well as the flowering shrubs which the little flower-peckers (*Certhiola*) frequent, will also be often seen the little broad-billed tyrant-bird, known also as pipitoorie (*Todirostrum cinereum*). These tiny birds are about $3\frac{1}{2}$ inches in length, ashy above, with black crown, black wings edged with yellow and white, and black tail edged with white, and yellow throughout the under surface. The bills are very long, broad and flattened.

A very common small tyrant, about 4-5 inches in length, known as cotton-bird (*Fluvicola pica*), is also usually to be found about the grassy parts of the town, and more especially by the trenches of the outskirts among grassy and bushy wastes. With the exception of the back of the head, the middle back, the wings and tail, which are black, the rest of the bird is a pure white.

These pretty but sober-coloured little birds feed chiefly on worms and insects which they seek among the grass and low bush and on the ground. They are not at all shy, but will allow of one's close approach.

In similar places to the preceding on the outskirts of the town will be found another small tyrant, somewhat

smaller than the cotton-bird and known as the parson-bird (*Arundinicola leucocephala*). With the exception of the head and neck which are white, the rest of this bird is of a deep shiny black in the male, while in the female it is of a prevailing ash-colour, except the head and sides of face and the under surface which are whitish, while the tail is black. These birds, like the foregoing, frequent the neighbourhood of water, perching on the small twigs and stems, but chiefly on the reeds and reed-like growths. Almost invariably they will be seen in pairs, darting from bush to bush in search of insects. The common name is evidently taken from the resemblance of its colours to those of a parson and his gown.

Quite different from the preceding tyrant birds, but inhabiting the same districts on the outskirts of the city, are the little spine-tails commonly known as rootie (*Synallaxis cinnamomea*), evidently so named from its cry. They are about $5\frac{1}{2}$ inches in length, of a rich rusty-red above, with white under surface and with a yellow chin. The tails are very spiny, the shafts of the quills projecting some distance beyond the plumes. The bill is long and slender.

These little spine-tails are the only town representatives of the large family of American bush creepers or spine-tails (*Dendrocolaptidæ*), which altogether number more than 200 species. They are usually, throughout the family, of some shade of brown; and in their bills, feet and spiny tails, the typical forms approach the true creepers of the Old World, with which they closely agree in habits. They are, however, chiefly forest birds, and but few of them, as in our common rootie, resort to the

reeds and rushes in open swampy lands, and to the low bush in waste or grassy places.

Of the large groups of the cotingas or American chatterers, and the manakins, which furnish so many of our most brilliantly and distinctively coloured forest birds, there are no representatives to be found about the town, but of the large group of the American bush-shrikes and ant-thrushes (*Formicariidæ*), which, as a rule, are confined to the dense forest, one large and typical species, known as check-bird (*Thamnophilus doliatus*), occurs, and by no means sparsely. This bird is about 5½ inches in length, and is readily recognised by the close white and black bands which cover the whole body above and below in the male, alternating with each other, while the head is black with a concealed crest of white feathers. The females are very different from the males, the plumage being of a prevailing rusty-red tint with dark striations on the neck, while below it is of a pale, reddish yellow, with pale black striations on the throat.

The check-bird, like the members of the family generally, has a strong, hooked, shrike-like bill, with which it can protect itself even against the birds of prey which it attacks and pursues with a loud, harsh cry. It feeds upon insects generally, larvæ and ants included; and is a lively bird, constantly on the move, uttering a by no means pleasing cry, made up of a succession of harsh and loud sounds, like the other songless birds generally.

Up to this point, only the members of the great order of the *Passeres* have been considered, but there are representatives of many of the other orders. Thus among the great oronoque trees in the Botanic Gardens, a small woodpecker (*Picumnus spilogaster*) will almost

always be seen, jumping about from branch to branch, and climbing up and around, tapping the bark with their little bills, making the characteristic sound of the woodpecker's knock, though much fainter than made by the ordinary members of the group.

These little birds, though possessing the wedge-shaped bill and the zygodactyle feet, two toes forwards and two backwards, of the group of Picarian birds, have soft rounded tails, not the stiff sharpened spiny tails characteristic of the family. They are about $3\frac{1}{2}$ inches in length, brown above, crossed by indistinct yellowish and reddish brown bars, with a black head, the feathers having scarlet tips in the male, and the nape tipped with white ; while below, they are barred with black, the hinder parts being blotched with the same colour.

In various parts of the town, but very commonly on the outskirts, five species of the family of the cuckoos are to be found, two of which are forms of the genus *Crotophaga*, characterised by keel-like crests on the upper part of the beaks. The smaller species (*C. ani*), about 12 inches in length, is one of the commonest of our birds, both in town and elsewhere. In these, the crest of the bill is continued from base to tip ; while, in the larger and less common form (*C. major*) about 18 inches in length, the crest is depressed towards the middle and gradually becomes lower to the tip. They are both of a deep black colour with violet-blue reflections, which are brighter, and much more definite in the larger species especially on the wings, tail and under surface of the body. The greater number of the feathers on the neck, shoulder and breast, are patterned on the edges with paler coppery or bronze blue, much more marked in the large species.

The habits of these two birds are somewhat different—the commoner species living in large flocks, and even building their nests together gregariously, and frequenting the pastures and roads as well as the low bush, especially where cattle are kept, in search of larvæ and other insects; while the larger are seldom seen more than two together, not on the ground, but in the high trees and tall shrubs.

The flesh of these birds, owing to an unpleasant flavour, is not considered good for the table; though it is used among the older black creoles as a medicine for those subject to fits, for whom it is supposed to be extremely beneficial.

Another common member of this family is the bird known as wife-sick (*Diplopterus navius*), about 10 inches in length, which is often to be heard among the bushes whistling out the melancholy notes from which its common name is taken. The beak is rather short, and the tail long and graduated. The head is crested with black and red and furnished with a pronounced white upper eye-streak, and the upper surface is marked with dark centres to the feathers outlined by reddish-grey. The under parts are white or greyish, with a reddish-brown tinge on the front of the neck. They feed chiefly on insects, and they will often be noticed catching these on the ground or among the bushes.

The remaining cuckoos are two species of the genus *Coccygus*, and are commonly known by the name baby-birds. The smaller (*C. americanus*), less than 12 inches in length, is of a shiny coppery brown above, with a white or greenish-white under surface; while the larger (*C. minor*), more than 12 inches in length, is of a pale

shiny brown above, with a pale bluish grey head, and with the throat brownish white, the rest of the under surface being of a pale reddish-brown or yellowish tint. The tails are long and graduated in both species, black or brownish black, with large white spots. The bills are long, curved, and black, the under mandible being yellow at the base. These birds are sometimes seen among the large mango and sour-sop trees about the town, where, except they are in the act of catching insects, they remain as if dead to their surroundings. The name foolish-bird is also applied to them. Like the other members of the family they are typically zygodactyle.

Occasionally, the large collared kingfisher (*Ceryle torquata*)—easily recognised by its large size (about 16 inches in length), its crested black-streaked head with long wedge-shaped formidable bill, its prevailing blue colour white, spotted behind, its white throat and collar and its rusty-red belly—together with the small green kingfisher (*Ceryle superciliosa*)—recognised by its small size, its prevailing bronze-green above, its short-crested head with a red spot before the eye, while the under side is of a rusty red in front with a collar on the sides of the neck, and pure white behind, the breast being crossed by a green band in the female—will be seen either near the lakes in the Botanic Gardens or along the Lamaha canal at the back, perching on the branches or dry sticks overhanging the water; but as these are only rarely to be seen, and are few in number, no more detailed mention of them is necessary.

Very occasionally, the long-tailed paradise jacamar (*Urogalba paradisea*), about 11 inches in length will be met with about the bushy parts on the outskirts of the

town, but these are evidently, from the very rare occasions on which they are seen, but casual visitors. They will readily be recognised by their long, sharp and straight, triangular bills, their bluish bronze-green plumage above and below, the brown tint on the head, and a large white gorget beneath, while the tail and especially the two central feathers are extremely long. They are quiet, sluggish, insectivorous creatures, and are generally seen perching in the same place for long periods.

One of the most important of the families of the Picarian birds is that of the humming-birds (*Trochilidæ*), which, with the swifts (*Cypselidæ*), are often separated into a distinct group, the Macrochires, owing to the great development of the wings, the arrangement of the feather tracts, and other characters in which they agree with each other.

The humming-birds are easily recognised by their thin, generally elongated bills, which in the young nestlings are quite short with a wide gape like the swifts; their thin and small feet, rendering them incapable, like the swifts, of perching on the ground; their long and pointed wings of 10 primary quills, moved by immense muscles, enabling them to maintain a sustained flight and to remain, as it were, almost stationary in the air for long periods; their 10 quilled tails; and their bifid tongues, moved by long occipital muscles, as in the woodpeckers. They are fierce, pugnacious birds, often fighting with each other, and frequently attacking and pursuing large tyrannical birds, such as the kiskadees and the hawks. Their food consists chiefly of insects, which they pick out of the nectarine parts of various flowers.

The various parts of the plumage of the humming-

birds, such as the head, neck, back, throat, cheeks, breast, belly and tail, as a general rule, present some of the most brilliant colouring to be found throughout the wide domain of nature; but it is a noteworthy feature, that in nearly all these parts, the full blaze of brightness is only perceivable at different angles of inclination to the eye, so that the richness of each part is only perceived separately. This is in marked contrast to the representations given in the various works on these birds, where for purposes of identification, all the possible tints to be obtained, are exhibited as obtainable at the same time, forming pictures of unsurpassable, but of utterly unobtainable beauty. Many of the most ornate, when looked at in certain positions, often present an altogether dull appearance in all parts, though when inclined and seen against the light, their sheen is perfectly dazzling.

About a dozen species of these birds may be obtained in or around the town, though many of them are only seen at rare intervals about the trees and the flowering plants on the outskirts of the city. Such is the case with two species of the hermits which are easily recognised by their elongated curved and coloured bills, their dull green and reddish-brown plumage and their long white-tipped graduated tails. The larger species (*Phæthornis superciliosus*) is about 6 inches or more in length, with a very long bill and the two central feathers of the tail very elongated; while the smaller (*Pygmornis longuemareus*) is about $3\frac{1}{2}$ inches in length, with the central tail feathers but slightly longer than the others.

The broad-winged sabre-wings (*Campylopterus largipennis*) are equally as uncommon as the hermits. They will at once be known by the very broad and flattened

quills of the primary feathers, and their unforked tails. They are about 5 inches long, green above and greyish below, the outer tail feathers being broadly tipped with white, and their bills long and strong. These are some of the most pugnacious of the family.

The mango humming-birds (*Lampornis*) are extremely common about the town, and two species, nearly 5 inches in length, are at times obtainable whose brilliant metallic violet-blue, bronze-green and red tails will easily mark them. In both species the bills are long and strong, and the upper surface of the body is of a rich grass or golden green colour: In the one (*L. violicauda*) the throat and breast are of a deep blue-black, fading into deep blue at the sides, while the belly is grey with a central black longitudinal stripe; and in the other (*L. gramineus*) the throat is deep grass green with a black breast, and grey belly with central black stripe. The females are pale grey below with a central stripe of black, while the young males are to be found in various changes of plumage between the colours of the two adult sexes. A common stage, which seems to persist for a long time, shews some chestnut-red on each side of the throat.

The fairy humming-birds (*Heliothrix auritus*), about 5 inches in length, are also often seen about the town. In these the bills are wedge-shaped and shorter than in the foregoing species; the upper surface is of a rich grass-green; the underneath of a pure white, spotted in the young birds; and the tail is long, especially in the females, and graduated, the outer feathers being white with black bases, and the central ones blue-black.

The ruby and topaz (*Chrysolampis moschitus*) is occasionally met with about town, but is much more common

outside. The male will at once be known by its brilliant ruby-red crown, and its reddish golden throat. The female is comparatively dowdy. They are about 4 inches in length, and will be recognised by their short, thin bills, a great part being hidden by the feathers which run for a considerable distance beyond the gape.

The white-tailed golden-throat (*Chrysobronchus virescens*), about 4 inches in length, will be known by its rather long and slightly curved coloured bill, its rich golden colour above and below, the throat and breast especially tinged with green and superbly bright, and by the shining golden green tail, which is tipped with white, with the outer webs of the outer tail feathers almost entirely of the same colour. These birds well illustrate the apparent dullness of colour of many of the humming-birds when seen in certain positions, while in others, seen against the line of light, they are extraordinarily sheeny. This species is to be met with, though not commonly, on the outskirts of the town.

The emerald humming-birds (*Agyrtria*) will be known by their rather long and straight, coloured bills, their plain grass or golden green upper surfaces, their bronze and black tails and their whitish under surface, the throat being generally of a bright green. Two or three species, about $3\frac{1}{2}$ inches in length, occur about town, and are very common. In one (*A. leucogaster*) which is extremely common in all parts, the throat and belly are white, the green of the sides almost meeting across the breast; while in another (*A. tobaci*), somewhat less common, the throat is of a brilliant grass green when viewed slantingly from the front, the edges of the feathers being darker.

Another emerald, which is distinguished from *A. leucogaster* by its smaller size, and much more bronze and golden green upper surface and sides, is also to be obtained. The males have coloured bills and the females black, and the species seems to be indistinguishable from *A. chionopectus*, except by the slightly darker tail and the less pale-green head. It seems to be but a variety of this form.

The blue-chinned sapphire (*Eucephala cærulea*), about $3\frac{1}{2}$ inches in length, is also to be found on the outskirts of the town, though they are by no means common. This will easily be recognised by its bluish-green tint below, deeper and brighter on the throat, while on the chin it takes on a deep pure sapphire-blue colour. The tail is dark bluish-purple, and its covering feathers above and below are bright green.

The smallest of the group to be found about the town, and fairly commonly, is a tiny greenlet (*Chlorostilbon atala*). This is less than 3 inches in length, of a rather dull golden green above and brighter bluish-green below, with a thin and short bill, and with a tuft of white on each side across the hinder part of the belly.

Many of the commonest of the humming-birds, as mentioned above, are to be found at almost any time in the day, in the Promenade Gardens in the centre of the town, either on the wing or perching on the branches of the larger and less leafy trees. Their nests are often met with in quite low bushes about the ordinary house-gardens. Their common name among the ordinary creoles, is doctor-bird.

The swifts are represented by one species (*Chaturaspinicauda*), which is commonly mistaken for one of the

swallows, whose external appearance they closely resemble, while their habits are identical. In structure, however, such as in the arrangement both of the feather tracts on the body and of the muscles of the toes and wings, in their unnotched sternum or breastbone, and in their 10-quilled tails, they agree with the humming-birds, while the swallows are exactly like the ordinary passerine birds.

In the spiny-tailed swift, the wings are very long, the total length of the bird from the tip of the bill to the end of the wings being about 6 inches. The colour is of a prevailing bronze black above and below, the rump, throat and spiny tail being paler. I have never seen these birds about the houses in the city; but when seen in the sky, they will be distinguished by their long, narrow wings, and their proportionately more rapid, bat-like flight.

Three kinds of owls will occasionally be met with, one of which, the ubiquitous barn or screech owl (*Strix flammea*) is extremely common, especially about the churches and the larger houses on the outskirts. This species will readily be known by its yellowish-brown plumage, mottled with grey, yellowish-white, orange and blackish, much paler on the under side, and by the very distinct facial disks in the middle of which the eyes are placed.

The second species (*Scops cristatus*) has been met with but once, in my experience, when two young ones were taken from the loft of a house in the Brickdam. These are large crested owls, about 18-20 inches in length, of a deep or dull chocolate-brown, or brownish-red colour, marked with blackish, and with spots of white about the head.

The third form, the spectacled-owl (*Pulsatrix torquata*), is also a large bird, of about 20 inches or more in length. Their eyes are of a deep yellow or orange-yellow. The young birds are covered chiefly with fluffy white down, changing to dark or blackish-brown above, and yellowish or pale reddish-brown below, while a white streak marks out the facial disk like a spectacle, and a dark brown band girdles the neck and breast like a collar. These birds have only been met with on the outskirts of the town.

The owls though hawk-like in many respects, are easily distinguishable by their generally well-marked facial disk, and by their toes being turned two forwards and two backwards, as in the typical zygodactyle birds. Locally they are always mentioned by the lower classes as "night-owls."

Of the carrion-feeding birds or vultures, three or four species of the genus *Cathartes* are to be obtained about the town. The common black-head or so-called carrion crow (*Cathartes atrata*) may be seen at almost any time, in the streets, on the cocoa-nut or other high trees, on the top of the houses, or circling over head. Very frequently also, but seldom more than one at a time, the red-headed carrion crow or turkey-buzzard (*C. aura*), may be met with. These are much larger birds, about 30 inches in length, and are often referred to as governor bird, and king or governor of the carrion crows; but they cannot be confounded with the large king vulture (*Sarcorhamphus papa*) which is never found in the neighbourhood of the town.

Another species occasionally met with is the orange-headed carrion crow (*C. urubitinga*), of about the same

size as the common black-head, with the shafts of the quills above and below white. It seems to me doubtful whether the yellow-headed vulture (*C. pernigra*), which is also occasionally seen, is specifically distinct from this form, even though its plumage is blacker and the shafts of the quills brown above.

Of the great group of the hawks several are occasionally to be met with around the outskirts, and even at times in the city itself, or are seen flying overhead. Their food is a very variable one, from fish and crabs by the mud flats, worms and snails by the trenches, lizards, rats, etc., in the fields, to living birds which they tear to pieces during the shrieks of the victim.

The two most conspicuous are two large brown and red buzzards, about 20 inches in length, which, from their frequenting the mud-flats chiefly in search of crabs, fish, etc., are commonly known as crab-hawk and fish-hawk. In the one, the black-headed buzzard (*Buteogallus xquinoctialis*), the upper surface is of a prevailing ruddy and black tint, with black head, rump and throat, and with the ruddy under surface finely barred with black ; while in the other, the black-necked buzzard (*Busarellus nigricollis*) the prevailing colour is chestnut red, the feathers with black stripes, those of the head and neck all round of a yellowish-white with long black blotches, while the throat is marked by a very conspicuous curved black patch.

The name chicken-hawk is applied indiscriminately to several of the smaller brown or slaty-coloured hawks, which, during early or adult life, are marked on the under surface with dark bars or blotches. One of the commonest, generally to be obtained among the courida

branches or mangrove stumps by the mud-flats, is the great-billed buzzard (*Asturina magnirostris*), about 14 or 15 inches in length, of an ashy grey colour, paler below, especially on the chin, and with the breast and belly closely barred with pale brownish-red.

Another, somewhat smaller kind, is the common harrier-hawk (*Micrastur gilvicollis*), of a dull blackish brown, somewhat paler on the head and neck, white below, and with the breast and belly closely barred with black; while a third, and very easily recognised form, is the common double-toothed or cuckoo falcon (*Harpagus bidentatus*), of about the same size, bluish or blackish slate-colour above, and deep chestnut below on the breast and belly (nearly white when young), while the upper mandible bears two teeth on each side.

Another so-called chicken hawk is the kite-falcon (*Elanina plumbea*), of much the same size, but recognised by its bluish black above, paling to blue-grey on the head, with black feathers round the eyes, and blue-grey below becoming paler on the throat. But perhaps the commonest of these birds on the outskirts of the town is the crested or laughing falcon (*Herpetotheres cachinans*), a larger bird of about 18 inches in length, brown above and yellowish white below, the crested head and a collar round the neck of this latter tint and streaked with blackish brown, while the throat bears a dark and rather broad cross band.

There still remain to be noticed some few species of birds which are commonly distributed about the neighbourhood of the town, and which are to be seen on almost any occasion in favourable situations. Of these three species of gulls are chiefly worthy of note, for they

will always be seen about the river side in the harbour. The large scissor-bill gull (*Rhynchops nigra*) will at once be known by the peculiarly flattened (in a vertical direction) and elongated bill, from which its name is taken; while the greater tern (*Sterna magnirostris*) and the lesser tern (*S. superciliaris*) will also be easily identified from their size and plumage—the former species, about 17 inches in length, being of a bluish grey above with black head and of a pure white below; and the latter about 10 inches in length, of similar colouring, but much paler on the back, being almost white. They will be readily distinguished from the true gull (*Larus atricilla*), which is also occasionally to be seen, by their longer and sharply pointed bills.

Of the group of the pigeons and doves, two species of *Chamæpelis*, known commonly as ground doves, are met with all over the town in gardens and unfrequented roads. The smaller, *C. griseola*, nearly 6 inches in length, is of a pale ashy-brown above, paler and more ashy on the head, and of a pale purplish-grey below; while the larger, *C. passerina*, nearly 7 inches in length, is of a dull bronze brown above, darker on the head, and much paler below, with the feathers of the head, neck, throat and breast, patterned with darker brown or black.

In the Botanic Gardens, and on the outskirts of the town, in the neighbourhood of water, the small blue grey and brown herons (*Ardea cyanura*) are always to be met with. These are commonly known as chow (ow as in how), on account of their cry, though the term shypook is just as commonly applied to them.


The foregoing birds are those which will be commonly under notice in and around the town, and it is

hoped that, though but briefly diagnosed, they will be found to be sufficiently characterised for recognition by all who may be desirous of becoming familiar with our feathered friends and foes.

Many other species may at times be encountered on the outskirts of the town, and along the sea or river border, or may be seen flying overhead; but space forbids more than the bare mention of the chief of these. Such are the large white herons (*Ardea egretta*), the small white egret (*A. candidissima*), the brown booby (*Sula fusca*), the common pigeon (*Columba rufina*), the large ground dove (*Engyptila rufaxilla*), the blue quack (*Nyctherodius violaceus*), the reddish crane (*Porsana cayennensis*), the blue moorhen (*Porphyrio martinicus*), the long-legged and long-toed spurwing (*Parra jacana*), the small spotted sandpiper (*Tringoides macularius*), the American golden plover (*Charadrius virginicus*), the scarlet Ibis or curry-curry (*Eudocimus ruber*), the bronze bush curry-curry (*Harpiprion cayennensis*), the negro cop or jabiru (*Mycteria americana*), the heri (*Ciconia maguari*), the common screecher parrot (*Chrysotis ochrocephala*), etc.; but these will be seen but at rare intervals, and are therefore hardly to be included among the birds of Georgetown,—with the exception of a few species, such as the blue moorhen and the spur-wing, which, in the sheltered precincts of the Botanic Gardens, are making to themselves a resting-place and a home.

The Minor Industries in Trinidad and Tobago.

By Dr. Chittenden, C.M.Z.S.—Trinidad.

HE promotion of the so-called "Minor Industries" has become of recent years, more or less a fixed policy of Governments in all parts of the world, and new products, under this rather ambiguous heading,* have been stimulated in many instances at considerable public cost.

In England Mr. GLADSTONE set the ball a rolling by urging fruit growing and preserving; this has since become rather a major than a minor industry. For the colonies Kew is now recognised as the Central Authority or Propaganda, and is in communication with Botanical Stations throughout the Empire, for the distribution of new plants, and instruction as to their mode of cultivation. The different Consular Agencies have been utilised for the same end and various premiums and subsidies paid, although not to such an extent as to amount to Bounties,

In his article entitled *The West Indian Bundle of Sticks*, which appeared in the December number of *Timehri* 1889, Mr. DARNELL DAVIS urged the closer political union of the British West Indies. Should there not be also a closer commercial and agricultural union? Mr. DAVIS described a solitary Frenchman on the Isthmus of Suez, who, on being asked what he was doing, replied "I am digging the Suez Canal!" In Trinidad Sir W. ROBINSON has taken a similar role

* Mr. J. H. Hart, of the Trinidad Botanical Gardens, suggests the term "subsidiary."

with regard to minor industries, and new commercial products. Arriving here at a period of great agricultural depression, he urged, one after another, new and paying industries, he established Agricultural Boards, subsidised Fruit Steamers and encouraged in every possible way the opening up of the virgin lands of the interior. His activity and persistence in this good work is now beginning to show good results and in a very few years hence will no doubt ensure a great and general prosperity. This new departure has, nevertheless, been regarded by many not only with apathy, dislike, or contempt, but has even met with active opposition. The West India Committee, who have their head-quarters in London, have come to the conclusion that the present moment is not propitious for new ventures, and that labourers, imported into the colony at their expense (?) should not be attracted from the Sugar Estates. This argument is sound if we regard a body of men as so much capital, stock-in-trade, or even as a distinct "labour caste," not destined for moral or material progress! But the W. I. C., if they do entertain this view, have only expressed it in their sheet marked "Confidential," they could never maintain it in the open. The final issue of their correspondence with the Colonial Office on this subject has shewn that the interest of the masses cannot be sacrificed for the benefit of the few: Sugar planters must seek their remedy not in this direction, but by improved scientific methods, and labour saving appliances. Were they (the W. I. C.) to leave the smoky atmosphere of London, and judge for themselves by the bright light of the Tropics, they would understand their interests far better, and per-

haps adapt themselves to the necessity of the case. When a staple industry is controlled by a few individuals, although the Revenue may show a surplus and the exports and imports be satisfactory, yet if almost the entire population are working for wages on the lowest possible scale, not participating in profits, and with a very small chance of ever acquiring an independence, their care and maintainance in old age and sickness, being more or less a charge on the Public Funds, then there is good cause for anxiety on the part of the Government. The people are at a dangerously low level, and if any misadventure occurs to the staple industry, the confusion resulting would be disagreeable to contemplate; this is more especially the case where labourers have been recruited from the four quarters of the Globe, without any thought of their power of assimilation. And these are the reasons why it is sought to establish in time a sturdy class of small peasant proprietors and a varied culture,—in short to put our eggs into more than *one* basket.

An assumed cause of dissatisfaction and consequent opposition to the progress of minor industries and the opening up of the interior in Trinidad on the part of certain planters, was the Governor's reference to Sugar and Cocoa as the "Twin Molocks". He innocently meaning that *these two staples should not alone occupy men's thoughts*, and nothing more. A paper by Professor HARRISON in the December number of *Timehri* 1890, shows how successfully Sir W. ROBINSON helped to promote one of these Molocks in Barbados. His efforts here to help on the prosperity of the twin deity—by waking up our rather slovenly cacao planters will also help to dispose of this absurd charge. Trinidad cocoa, has

by a careless system of planting the inferior but heavy bearing varieties together with the fine Criollo and Forestero, through cross fertilisation, brought about a very prolific, but somewhat degenerate hybrid. The aim now is to make the best of it and improve the careless mode of preparation of the small growers, and avoid the loss in wet weather by means of artificial drying. With this object in view His Excellency at the last Exhibition offered prizes for the best apparatus, and it is certain that by this means great losses will be avoided in the future and in all probability further benefit effected by the establishment of Central Usines.

Nearly every possible new product has been brought under notice and fully discussed here during the last few years, and seeds and plants distributed from the Royal Botanic Gardens. Experimental cultivation of new products has also been pushed forward on a moderate scale at the Government Plantation at Chaguanas—seeds of ben, onion, jute, etc., vanilla, black pepper, castilloa, hevea, cardamon bulbs, etc.—with no very decided result. Amongst fibre plants, the ramie has been taken up, in a half-hearted way by a private company; they did not go very far with the enterprise because they selected the wrong soil. In the sister Island “Tobago,” the silk grass, *Furcraea Cubensis*, has been started more successfully—a Limited Liability Company have it in hand and can shew already 76 or 80 acres ready to cut. *Sanseveira guiniensis* (Bow string hemp), *a more valuable fibre plant*, is however more likely to make its way here, it grows remarkably well under cocoanuts and is therefore a useful subsidiary staple. An almost inconceivable variety of hand cleaned fibres, indigenous to the soil,

have found their way into Exhibitions here for more than twenty years past, and gained Medals and special commendation, but so far without any further result, excepting "Maholtine," the *Abutilon periplocifolium*. It has this recommendation from an economic point of view, that (it is the rankest weed known) *it grows without any cultivation on the most barren grounds*, overtops every thing else, is easily decorticated and is worth about £20 a ton. It is a glossy delicate bast tissue, fairly strong, and if desired for cultivation might be simply sown broadcast with rice, groundnuts or maize. It has lately attracted much attention in America and in Guadeloupe.

Oranges have been exported from here to England, the United States and Canada, with a fair amount of success; a prize of £50 has also been offered to encourage their systematic cultivation. Bananas have been very extensively planted and suckers imported from Jamaica at a considerable expense. The shipments hitherto have not been encouraging, the difficulty being that the finest quality, grown on the rich lands of the interior, could not be got out, on account of the heavy mud roads. It will be an easier thing to deal with them in a dry or preserved state. Much success has been obtained in this direction, and as a proof of their appreciation in England some substantial orders have been received here. Limes seem likely to become very soon an export article of some importance. There are now no less than twelve formed estates including one in Tobago carrying altogether about 100,000 trees. They attain great perfection here and are valued in the United States more than lemons. It is anticipated that over

20,000 crates will be shipped this year. Nutmegs have been taken up pretty generally—one firm is putting down 10,000 trees. Tonquin bean and the different rubbers have not been very seriously pushed forward.

Coffee is perhaps the one staple that would singly take the place of sugar, if need be, and the quality grown here has been very favourably reported upon : its extension is increasing, but slowly. With a view to extend this cultivation, it was suggested at a recent meeting of the Central Agricultural Board that money awards should be offered by the Government in proportion to the acreage of new coffee plantations opened out. It has been shewn that a nett return of at least £20 os. od. an acre can be obtained in Trinidad, and it should therefore give remunerative employment to thousands who do not know which way to turn at the present moment ; this would be more certain if taken up by small land owners, who together with their families might work on their coffee patches. The returns of the last Census will help to shew the necessity for some active steps in this, or other directions. It appears that the large agricultural villages, depending on the Sugar Estates are becoming fast depopulated, *e.g.* "Arouca." This is done in some cases to the abandonment of large Sugar Estates and otherwise to the low rate, and uncertain demand for labour, the high cost of living, and the centralising of management, whereby numbers of the old class of employes are thrown out—ergo the closing of village shops and the *efflux of labourers, as the compilers of the Census Returns maintain, in other colonies.*

Tobacco is the subject of Government solicitude, and is cultivated at Sapia by an expert from Cuba as an

experiment. It is not likely to become an important staple although it seems to be a richly paying one.

In Tobago the impulse towards new products has been developed almost as strongly as it has been here, but with scarcely equal success. Since the planters of that little colony were introduced to the beauties of "in forma pauperis" suits and found themselves in a state of perpetual litigation with their labourers, it has been found impossible to carry on cane cultivation on the *Metayer System*—which requires above all things a paternal relationship between the employer and his people. Something else had therefore to be thought of, but cocoa, spices, etc. did not thrive, so some planters turned their stock into the cane pieces and found that was probably the best change they could make. The grasses of Tobago are highly nourishing—Guinea Grass—suited both for sheep and horned stock, more especially the former. Mr. DATE has some sheep now weighing 180 lbs. each. Considering that neither Demerara nor Trinidad can raise sheep at a profit, that Trinidad cannot breed cattle, except for milking, or draught purposes, there is no doubt a good prospect in this line.

Plants of various kinds have been advocated for tanning and dye stuffs, but recently the value of mangrove (*Rhizophora mangle*) have been better understood, and the dreary and unprofitable lagoons may turn out to be a mine of wealth. Mangrove bark crushed and dried is worth £10 a ton in England, it contains about 38 per cent. of tannin and recently the finest leather has been turned out here, by its use, in little over 25 days.

One industry that certainly should not come last is that of *vegetable or provision growing*, a very important item for West Indian peasants, yet strange to say this is the most backward of all! The reason is to be found in the difficulties of transport over the mud roads. £28,000 value is consequently imported from foreign ports. No wonder therefore that labour on Sugar estates is expensive, and the *greater reason for opening up the interior*.



Commissioners on Tour.

By the Hon. J. W. Carrington, C.M.G., Attorney General.



T the meeting of the Combined Court held in March last, the question of opening up the interior of the country came on for consideration, and, on the 5th of that month, the following Resolution was moved by the Hon. Sir CHARLES BRUCE, K.C.M.G., the Government Secretary :—

Whereas the Sproston Dock and Foundry Company have submitted to the Government a proposal to connect the Upper Demerara and Upper Essequibo Rivers for the transport of passengers, merchandize, and timber, on condition that they shall receive certain grants of Crown Lands and a loan of one hundred and sixty-eight thousand dollars, (\$168,000):—

Be it Resolved,—That this Court sanctions the issue of a loan to the Sproston Dock and Foundry Company of an amount not exceeding one hundred and sixty-eight thousand dollars, (\$168,000) by means of the Public Loan Ordinance, 1887, for the purposes and subject to the conditions hereinafter stated, viz. :

To connect the rivers Demerara and Essequibo by means of a Railway with a permanent way and rolling stock suitable for the transport of passengers, merchandize, and timber between such points, and on such conditions, and within such period as shall be approved by the Governor and Court of Policy; and

To run a daily steamer between Georgetown and the Demerara terminus of the said Railway, and to provide steam communication on the Essequibo in connexion with the Essequibo terminus, on such conditions and for such term of years as shall be approved by the Governor and Court of Policy :

Provided that the Contractors shall find such security as shall be approved by the Governor and Court of Policy for the repayment of the loan within 15 years, with interest at four per cent. (4 o/o) per annum, and that due provision be made in the Contract for the payment by the Contractors of a penalty in case of non-performance of the Contract.

And be it further Resolved,—That if such Contract as shall be made under the terms of this Resolution shall be carried out so far as may be to the satisfaction of the Governor and Court of Policy within a period of three years, this Court undertakes to provide for the extension of the present Steamer Contract for the same subsidy as now paid, but with such modifications in the terms of it as shall be approved by the Governor and Court of Policy, for such period, not exceeding ten years beyond the date of the expiration of the present Contract, as the Contractors shall continue the service of the proposed Railway to the satisfaction of the Governor and Court of Policy.

There was, however, some opposition shown to the Government proposal by the Elective Members of the Court of Policy and the Financial Representatives, and in the result, after considerable debate, the following amendment, moved by the Hon. B. HOWELL JONES, was carried by a majority of one :—

“Whereas since Mr. Sproston's offer to construct a line of Railway from the Demerara River to the Essequibo River has been received, fresh proposals have been made to the Government by other parties :

“*Be it Resolved*,—That a Committee be appointed by the Governor to inquire and report on the best way of opening up the country above the Rapids in the Essequibo River, and this Court pledges itself to find the funds,—not exceeding a loan of \$200,000 or a subsidy not exceeding \$20,000—to meet any scheme which the Court of Policy, on the report of the Committee, may decide on.”

In pursuance of this Resolution the Lieut-Governor, Sir CHARLES BRUCE, K.C.M.G., who had in the meanwhile assumed the administration of the Government of the Colony, on departure on leave of the Governor, Viscount GORMANSTON, K.C.M.G., issued, on the 4th April, 1891, a Commission under the Public Seal to the Hon. J. W. CARRINGTON, C.M.G., the Hon. B. HOWELL JONES, A. WEBER, Esq., F.R., and D. M. HUTTON, Esq., F.R., directing them to “inquire and report upon the best way of opening up the country above the

Rapids in the Essequibo River and generally the District lying between the Demerara and Essequibo Rivers." These gentleman had been nominated by Lord GORMANSTON, before his departure.

Mr. J. HAMPDEN KING, of the Government Secretariat, was appointed Secretary to the Commissioners.

The Commissioners accordingly held several sittings at which they took the evidence of some of the principal representatives of the gold and timber industries, of gentlemen who were interested in the prosperity of the Town of Bartica, of public officers, and of some other persons who were able to furnish them with valuable information on the subject-matter of their inquiry. In the prosecution of their Commission they arrived at the conclusion that it would be of advantage for them to see for themselves something of that portion of the Colony on the opening up of which they were required to report, and, in particular, to traverse the country lying between the Demerara and Essequibo Rivers and the River Essequibo itself, for the purpose of ascertaining what is the shortest and easiest way of obtaining access to the gold fields and the timber lands of the Essequibo and Potaro Rivers, having regard to the delay and danger attendant on the navigation of the former River in consequence of the existence of falls, or more strictly speaking rapids, in its lower course. With regard to the country between the Demerara and the Essequibo, it was decided to explore the route between the Manabadeen Creek on the Demerara and the Moco Moco Creek on the Essequibo—a route which had been already examined and reported upon, in July, 1890, by the late Mr. L. PAYNE GALLWEY, Colonial Civil Engineer, who went over it in

company with Col. the Hon. R. S. COTTON, then Inspector General of Police, and Major J. E. CAULFEILD, then Commanding the Troops in the Colony.

Mr. HUTSON was unfortunately prevented by professional engagements from going with the expedition, but it was honoured with the company of the Lieut.-Governor. Besides His Excellency and the three Commissioners mentioned above and the Secretary, Mr. KING, the party consisted of Mr. M. MCTURK, Special Magistrate of the Essequibo, who was to command the expedition—and who so capable as he to guide it, as the boatmen's song has it, "obah dangah, rock, and fall?"—Dr. F. H. ANDERSON, who was to minister, if necessary, to sick members of the party, Mr. J. M. MOORE, Acting Colonial Civil Engineer, and Mr. J. MENZIES, who kindly undertook to see to the commissariat arrangements.

The plan of campaign decided upon was for the party to go up the River Demerara as far as the Manabadeen Creek in a special steamer, to ascend this Creek as far as practicable and there effect a junction with a small party of Mr. MCTURK'S men, who were in the meantime to bring boats for the party as far as they could up the Moco Moco Creek; to cross on foot to the upper waters of the Moco Moco; to descend this Creek to the River Essequibo, and then ascend this River and the River Potaro as far as the Tumatumari Falls. At this point we were to turn and come back down the Essequibo to the Penal Settlement and Bartica.

On Friday, the 15th May, 1891, we set out on our expedition in the special steamer "Charlestown," which left the steamer stelling at Georgetown at 7.17 a.m.

The weather was fine, and we had a pleasant run up the Demerara, observing with interest its fine stream and the fairly numerous settlements and habitations on its banks. At 1.40 p.m. we reached the Christianburg timber-depôt and saw-mill, and took on board Mr. J. D. PATERSON, the proprietor, and four of his men. This gentleman was exceedingly kind and helpful during the time that he journeyed with us, and glad we were that he had joined us. The River was full of water, and the steamer had no difficulty in making her way beyond Akyma, the regular stopping-place, except at two places where the channel was obstructed by rocks, and where careful navigation was in consequence required. The scenery in the upper reaches of the River is in many places very beautiful. At 5.55 p.m. we dropped anchor at the mouth of the Manabadeen Creek.

Next morning early, Saturday, the 16th May, we started on our journey up the Creek, in five ballahoos, which were propelled by poles by Aboriginal Indians and other persons who had been engaged for us by the Rev. W. J. WEST, of the Muritaro Mission. The Creek runs generally from West to East, but there are many turns in its course. For the first mile or so the land on either side is swampy, but after this the banks are more or less well defined. The soil appeared for the most part to be composed of a fine sand. The Creek was of an average width of 20 feet and an average depth of five feet. The current was running generally about seven miles an hour, but in its upper course it was much swifter, with occasional rapids. There was a large number of tacoubas and fallen trees across the stream, some of which had been recently cut or

removed by a boat's party sent for that purpose by the Public Works Department and whom we found at work some miles up the Creek. The trees on either side made an arch of foliage overhead, and the scenery formed a delightful contrast to the monotony of Georgetown and its suburbs. After ascending nearly ten miles we got out, soon after midday, at an old landing, at a point 65 feet higher than the mouth of the Creek. Here we found five benabs and huts, with a family of three Aboriginal Indians,—a man, his wife, and her sister,—in one of them. The man was suffering from fever, and Dr. ANDERSON kindly attended to him. His two companions were young and not uncomely, except that they had disfigured themselves by tattooing marks resembling moustaches on their upper lips, and that they were possessed, in a not inconsiderable degree, of that *embonpoint* which seems to be a marked characteristic of Buck ladies. They were clothed in seemly fashion, and the proof of this is to be found in the fact that when Mr. MOORE took a photograph of the party in front of their benab, they were placed among the group.

Mr. MCTURK'S men were not at the landing, and soon after our arrival he set out in quest of them. After an absence of two or three hours, he returned with the report that he could find no trace of them. It was then settled to camp at the landing for the night, and in the meanwhile we had a bath in the clear reddish-brown waters of the Creek, followed by a good meal. Mr. MCTURK then saw to the making up of the loads for the bearers, and in doing so he held an "inquest" on, condemned, and ordered to be sent back, as too large, the tin box, or "canister" as it is generally called, of one of the party—I

will not say whom. We turned in early and had a quiet night in our hammocks, slung in two or three of the benabs.

Next day, Sunday, the 17th May, we made a start at 6.35 a.m., and immediately began to ascend. There was a well-defined path, which had been cleared through the forest, or "bush," as it is called, for the transport of timber, but walking on it was made troublesome by the logs or rollers which were laid down across it, at intervals of four or five feet. The path was about six or eight feet wide, and ran in a general direction from East to West. Soon after setting out we got on a plateau ranging from 105 to 210 feet in altitude above the point where we had left the River Demerara. In many places it was level, or nearly so, for a considerable distance. Early in the day Mr. MCTURK pointed out to us some marks in the sandy pathway, which showed that a jaguar had been rolling there a short time before. For a long way all the large trees had been cut out of the forest and taken over the skids to the Demerara. In some places, owing to the pooriness of the sandy soil, there was only what Mr. MCTURK called "morè bush," that is, the forest was composed entirely of tall but slender trees and saplings. We could not, however, observe our surroundings as much as we should have liked to do, because of the constant necessity we were under of paying heed to the logs across the path. Several showers of rain fell, but they were to a great extent intercepted by the trees overhead. In most, or at any rate many, places the soil appeared to be of a sandy character. There were comparatively few signs of animal life, although, near the end of our journey, Mr. MCTURK shot a brace of maroodies.

After crossing two small streams and resting once or twice for a few minutes, we came, a little before 9 a.m., to a well-marked depression in the plateau, in which there flowed a stream which, as the Indian bearers alleged, was a tributary of the Moco Moco. Soon mounting another plateau, we continued walking for about two hours more, and shortly before noon, after travelling about nine miles, came out at a landing on the Moco Moco, about 60 feet in height above the River Demerara at the mouth of the Manabadeen. Here we found some four Indian benabs, inhabited by a small family of Indians, composed, like that on the Manabadeen, of a man and two women. But these two were ancient and unlovely squaws. However they brought us some delicious pine-apples, and generally entreated us courteously.

There was still no sign of Mr. MCTURK'S men, so he borrowed a buck-shell from the Indians and went down the stream in search of them. In no long time he returned with the news that he had found the smallest of his three boats making its way up the Creek a few miles down, and that the delay in their arrival had been caused by the unexpectedly difficult nature of the work which they had had to do in clearing the Creek. When this boat arrived at the landing it was too late to descend the Creek, and it was therefore decided to wait until the next morning.

Accordingly, early on Monday, the 18th May, we began paddling down stream in Mr. MCTURK'S boat and some buck-shells and wood-skins borrowed from the Indians. The Creek ran, throughout almost its entire course, through swampy land, and was exceedingly tortuous. Not infrequently it would double back on itself, so

that two boats would be going nearly side by side in opposite directions. The scenery was delightful and was much admired by all of us. The trees high overhead, the creepers and orchidaceous and other growths hanging on their branches, the dim light, the clear dark waters of the Creek, with the tree trunks fallen across it, all made up a picture of natural beauty which was enchanting to habitués of the Public Buildings and Water Street. The only really heavy rain which we had during the whole trip fell during our descent of the Creek.

At 10 a.m. we arrived at the camping-place where were moored the two large and comfortable tent-boats, propelled by paddlers, which were to carry us for the remainder of the tour. Here Mr. PATERSON parted company with us, and went down the Essequibo in one of the buck-shells which we had borrowed from the Indians. After the live and dead freight of the three boats had been arranged in place, we got under way for the Essequibo and came out on its broad bosom about noon, having travelled about 14 miles. At the mouth of the Creek the waters of this River are 25 feet higher than those of the River Demerara at the mouth of the Manabadeen Creek. The Essequibo is at this point, as almost throughout that portion of its course traversed by us, a magnificent stream, about a mile in width, with slightly muddy or clay-coloured waters, bordered by banks some two or three feet high, composed of loamy earth and covered with tall forest trees. The River was in full volume, and Mr. MCTURK told us that it presents a very different appearance when its waters are low. For some few miles we paddled up in shore on the right bank, thus

keeping out of the strong current in the middle of the River, and then went across to the left bank. At 3.25 p.m. we went ashore at a camping-place called "Don't Know," opposite the Arisaro Hills, a low range extending for some distance on the right bank of the River, and for the first time pitched our own camp. For the information of distant readers it may be as well to describe how this is done. The boatmen of the party go off into the forest with their cutlasses, and soon return with a sufficient number of poles, of the requisite size and length, to make the frame-work of one or more "benabs," as may be necessary. These poles are tied together with "bush-rope." Tarpaulins are then spread on the roof part, the hammocks are slung inside, and, in an hour or so the camp is completed. While we were engaged in this work, we spoke two boats full of gold-diggers passing down to Bartica, and they promised to report us. At this place Mr. MCTURK'S dogs ran to earth, or rather to a hollow in a tree trunk, an acouri or agouti, and this animal and the maroodies made up the tale of the game that came into our larder during the expedition. And so, after dinner, with the big trees and the nocturnal noises of the forest—not to mention some still louder and more persistent in our own camp—around us, we went to sleep.

Under Mr. MCTURK'S command there was no late lying a-bed or rather in our hammocks, and so, early on the morning of the next day, Tuesday, the 19th May, we got under way on our journey up the Essequibo, keeping near the left bank. We met several boats full of gold-diggers coming down, but there was no other incident worth mention until, at 1.20 p.m., we reached the land-

ing-place of JACOBS, CARREIRO, and ROSA's placers, situated on the left bank of the River some miles below the mouth of Oumai Creek. Here we landed, and, with the exception of Mr. MENZIES who remained behind to superintend his arrangements, we soon set off on foot to see these placers, which are reputed to be the richest in the Colony. They are situated on Gilt Creek, a small tributary of Oumai Creek, and the most productive of them,—the one to which we were bound,—is distant some four miles from the landing-place. The path, if there can be said to be a path, lies through the bush over a series of hills and ravines, and, what with the hard iron-stone soil, the rough tree-roots, and the mud at intervals, it was not pleasant going. It was a matter of surprise to all of us that a regular pathway had not been made, and pack-mules or donkeys employed to carry up the supplies and bring down the gold, or that, at least, the track had not been cleared and made easier for the men-bearers. After something more than a hour's sharp walking, we reached the placer, and were very kindly received by Mr. JULY and Mr. FORBES in their comfortable little house on the side of the ravine. Imagine a narrow valley or ravine, with the sides rising sharply and clothed at the tops with forest trees, with the reddish clay and darker gravel of the earth in the middle and lower parts of it dug up and thrown about in long ridges and heaps, and with a party of some dozen men at work on a wooden box or sluice in the upper part—and you have a rough picture of the famous placer as we saw it. We went down to the working, and Mr. FORBES took a battel of "pay dirt" and washed it, showing us, as the result, a few particles of gold at the bottom of the vessel. We were also

shown the process of washing for gold in the sluice. This consists in one or more men taking up the gold-bearing gravel in a shovel and throwing it into the sluice or long wooden trough, open at the top. Through the sluice a small stream of water runs continually, and at two different points on it there sit two men who disintegrate and wash the gravel over little frames in the sluice, which contain quicksilver. The gold falls to the bottom and becomes attached to the quicksilver, while the gravel and dirt are carried away by the water down the sluice. Mr. FORBES told us that the washing for that day for that sluice would realize about 5 oz. of gold. Lower down in the valley, some months before, the daily yield had been sometimes as much as 6 lbs. In this lower portion of the valley we could see the building which gives cover to the machinery erected by the Demerara Gold Association for the purpose of working a quartz reef there, but there was no work being done at the time.

Some of us, more enterprising or less wise than the others, went off to see an alleged wonderful waterfall higher up the valley, but after nearly half-an-hour they returned, and some of them, I am sorry to say, used strong expressions about that waterfall and the persons who had induced them to go to see it.

Before leaving, we were shown some bars of gold and the crucibles in which they were melted. I believe this is the only placer from which the gold is sent down in the form of bars.

We reached our camp at the landing-place in time for a bath and a capital dinner, whereat Mr. MCTURK toasted Sir CHARLES BRUCE, in suitable wine, as the first Governor of British Guiana who had been on a placer.

And thus to our hammocks and to the wooing of sleep, in spite of a whole host of loud-mouthed frogs.

Soon after 6 a.m.—the usual time for quitting camp throughout our expedition—on Wednesday, the 20th May, we were once more *en route*, leaving behind us at the landing-place the smallest of the three boats and some of our stores. Some way up we had a good view of the Oumai Mountains on the left bank. We passed over two or three rapids, but as the River was in full volume they did not make any great show. Then we came upon a series of islands, some of them of considerable size, all of them wooded, and most of them more or less picturesque. After getting away from these, we followed the bend of the River to the East, and had a fine view of a range of long and high mountains behind the Conawarook Creek district. One of these mountains has a flat top, and was conjectured to be about 3,000 feet high. Opposite the mouth of the River Potaro the Essequibo is very wide and lake-like, and the line of demarcation between its light-coloured waters and the darker waters of the Potaro can be clearly seen. It is at this point, that is to say, on the high bank of the Essequibo over against the mouth of the Potaro, that Mr. W. WYNN KENRICK, the Gold Commissioner, has proposed that a miners' town should be established.

Shortly before mid-day we entered the mouth of the Potaro, which we found to be a large and beautiful river, ranging between 600 and 800 yards in width, with its water of a dark reddish-brown colour, evidently deep and running strong and full, and for the most part with high and well-wooded banks. Near its mouth its course

is divided by an island of considerable size. We passed two or three miners' landing-places on the right bank, and at 2.30 p.m. we arrived at the foot of the Tumatumari Falls, and arranged to pitch our camp on a clean, sandy beach, a few hundred yards below them on the left bank. But before dinner Mr. MCTURK took us to a huge granite rock, at the end and to the left of the main fall, where we got out, and Mr. MOORE took a photograph of the fall and another of the party, with the fall in the background.

The Falls, which are perhaps half a mile in width, are much broken by islands, but a good view can be obtained of the main fall of which I have just spoken. This fall is about 600 yards long by about 200 yards wide, and the drop is about 20 feet. It is a fine sight to see the immense mass of water hurling itself down among the rocks and hollows, here breaking into foam and there pouring with resistless force over a barrier of granite. Ah ! we thought, if only the dwellers in Georgetown, and, for that matter, in other parts of the Colony, could see this grand and beautiful sight once in a way !

We were told that, a few months before, two boats had come through the Falls, with the result that they were broken into bits, and several men were drowned.

We then paddled across the foot of the Falls, being skilfully steered by Mr. MCTURK through the strong and whirling current, to the right bank, where we got out and inspected the simple but strong and serviceable portage made by Mr. MCTURK, some twelve months before, for facilitating the transport of boats and stores to places beyond the Falls. Here we found a party of men in camp, waiting till the next day to get their expedition over the

portage. Mr. MOORE took one or two more photographs, and then we went back to dinner and to sleep in the best camp which we had during the trip. On this day we met only one boat with gold-seekers.

Next day, Thursday, the 21st May, we were early astir and set forward in good time on the first stage of our homeward journey. It was a matter of exceeding regret that we could not spare another week to go up the River and see the mighty Kaieteur Fall. But regrets were idle, and so we resolved to make the most of our return journey during the two or three days that yet remained to us before we abandoned the pleasant and romantic bush life (if only one did not have to get up so very early in the morning!) and entered again upon the stern realities of existence.

Running down with the current in the middle of the stream, we made good way, and, at 10.19 a.m., put into JACOBS, CARREIRO, and ROSA's landing-place. Here we had breakfast, and spent some time in re-packing and re-arranging our stores and impediments, having before our eyes the fear of the Falls of the Essequibo. Some of the stores were left behind to be brought down by some favouring boat. Making good progress we arrived, at 4.2 p.m., at our old camping-place "Don't Know," and prepared to pass the night there. It was in a yet more wet and uncomfortable condition than on the preceding Monday night. This day we saw nine gold-expedition boats.

On Friday, the 22nd May, we were awake at 4 a.m., and got off at 5.20 a.m. for our last and longest journey in the boats. Running down with the powerful current past several islands, including Gluck Island, which is

some five or six miles long, we came, at 11.30 a.m., to Moonerie Island, a rocky islet at the head of the Falls. Here we landed for a few minutes, and made our final arrangements for running through the Falls. In the first tent boat were Sir CHARLES BRUCE, Mr. HOWELL JONES, Mr. WEBER, myself, and Mr. MCTURK, who acted as captain and issued the necessary orders for the guidance of the boat. The steersman was an old Indian, of Napoleonic visage, named SAMMY, who has been with Mr. MCTURK for many years. The steering is done by means of a huge and strong paddle, which is secured by a rope to the stern of the boat in an upright position, and which the steersman wields standing. In the bow stands the bowman with a similar paddle, but this is not made fast. It is astonishing what force can be brought to bear on the course of the boat by these two men with their simple instruments; in the strongest rush of water you will see them quickly and easily bring the boat round in order to avoid a rock in the channel.

In the second tent boat were Dr. ANDERSON, Mr. MOORE, Mr. MENZIES, and Mr. KING. They also had an experienced captain and bowman, both Indians. The third and smallest boat was manned by only four men, and carried the cook. Mr. MCTURK wished this boat to descend by the small side channels, but the Indian captain brought her through after us, and it did one good to see the pluck and skill with which he did so.

The Falls consist of seven or eight more or less swift and turbulent rapids, occupying the course of the River for as many miles, with intervals of smoother water between them. The total drop is about 25 feet. The

channel of the River is here broken with numerous wooded islands, and the scenery is beautiful, but one has little opportunity to contemplate it. The most difficult and dangerous falls for navigation are those named respectively Marihi and Tabinetta, which lie next to one another somewhere about the middle of the series. In this last-mentioned Fall we passed quite close to a sort of huge chasm, into which the water rushed with great force and curled back in an immense wave. One naturally feels both interested and excited in coming through these wild and whirling waters, and it is easy to see that to guide a boat safely through them requires in a high degree skill, and strength, and courage. The men paddle as hard as they can, in order to keep way on the boat and enable her to be guided by the steersman and the bowman.

The passage through the whole series of the Falls occupied a little more than an hour. At 1.20 p.m. we landed at Bethany Island, where there is a small Police Station. This is also a Gold Station, at which boats descending the River with gold are required to stop and report themselves. Here we learned that a few days previously a boat had been swamped in the Falls, and four men had lost their lives.

We had intended to pass the night at Bethany Island, but, as we had reached it in such good time, it was decided to push on to the Penal Settlement, near the mouth of the River Massaruni, one of the principal tributaries of the Essequibo, in the hope of getting there before nightfall. But in the lower reaches of the River we found the wind and the tide against us, with quite a little sea on in some places, and the result was that we did not arrive at Bartica until 8 p.m. and the Penal Settlement at 9.30 p.m.

Here we had a very late dinner at the Colony House, where we put up, and soon after went to bed. We passed some eight boats with gold-diggers during the day. Our men were paddling for something like 15 hours almost continuously.

Next morning, Saturday, the 23rd May, I returned to town in the Contract Steamer from Bartica. The Lieut.-Governor and the remainder of the party visited Bartica during the day,—being, I believe, considerably impressed with its growing size and importance,—and on Sunday, the 24th May, they also came back to town in the Contract Steamer.


So ended our expedition. It was, I think, successful in every way. Although we had one or two heavy rains and occasional showers, the weather was far more favourable than we could reasonably have expected at that season of the year. No one was sick or sorry, although the doctor kindly physicked some of us by way of precaution, and everyone was interested in the life we led and the scenes through which we were passing, and kept in the best of spirits. If there was that little disagreement as to whether that case of lager beer should be left behind at Oumai or brought on with us, what did it matter afterwards? With the exception of the failure of Mr. MCTURK'S men to get across to the Demerara side of the watershed between the two rivers—a failure which was easily accounted for—there was no hitch or delay throughout the tour. We fared well, and I hope, wisely also. And we shall always preserve pleasant memories of our roving visit to the interior of this immense country, with its great natural features in the shape of mighty rivers, vast forests, and high mountains.

It would be out of place to indicate in this paper any conclusions which the Commissioners were able to form on the questions submitted for their consideration. Let it suffice to say that, at any rate, what they had seen had given them a very clear idea of the magnitude and difficulty of those questions. That they may be able to offer some useful and practicable solution of these momentous questions must be, I feel sure, the hope of every well-wisher of the Colony.

I have to tender my best thanks to Mr. MOORE and Mr. MENZIES for their kindness in allowing me the use of their memoranda taken on the tour. The route-map attached has been kindly prepared by Mr. H. I. PERKINS and Mr. J. A. P. BOWHILL, of the Crown Surveyor's Office, at the instance of the Lieut.-Governor.

The Historical Geography of the West Indies.*

By N. Darnall Davis.

FROM the Clarendon Press there is being issued a Series of Volumes treating of the Historical Geography of the British Colonies. In the first place, in 1887, appeared, an *Introduction*, in which Colonies and Colonisation, Ancient and Modern, were treated of in a philosophical spirit. Then, in 1888, followed Volume I. of the Series, dealing with Great Britain's European Dependencies, her minor Asiatic Dependencies, and her Possessions in the Indian Ocean. And now we welcome Volume II, of which our own West Indies form the subject. The Series, from its happy execution, provides a set of standard class-books for higher grade schools and for colleges throughout the Empire. It, at the same time, forms a compendium of hand-books of reference, useful to men of the State at Home and in the Colonies. Its author is Mr. CHARLES PRESTWOOD LUCAS, B.A., of Balliol College, Oxford, and of the Colonial Office, London, who has for some years served as Private Secretary to Sir ROBERT HERBERT, Permanent Under Secretary for the Colonies. The Library of the Colonial Office contains a large collection of books relating to the Colonies. In these, Mr. LUCAS has at hand much of the material requisite for his

* A Historical Geography of the British Colonies—Vol. II. The West Indian Dependencies of Great Britain, by C. P. Lucas, B.A., of Balliol College, Oxford, and of the Colonial Office, London. Oxford, at the Clarendon Press, 1890.

undertaking. His own Volumes show that he has not confined himself to printed books : some of which repeat the errors of prior publications, from which they have been compiled : but has taken advantage of the facilities so handsomely afforded by the authorities of the Public Record Office ; and, by so doing, he has illustrated the history of the West Indies with some new facts. It is of the Volume about the West Indies that this article will treat.

To West Indians of the old order, who wonder whether any good thing can come out of Downing Street—being themselves as ignorant about the Colonial Office, as they believe the Colonial Office to be ignorant of the Colonies—this Volume will prove somewhat of a surprise. Here is a member of the Colonial Office staff displaying an intimate knowledge of these Colonies, and, at the same time, writing about them, in what may be described as a truly colonial spirit. That Englishmen who have transplanted themselves to the Colonies are Englishmen still, the author never forgets. One is reminded of Lord CHATHAM'S "I rejoice that America has resisted!" when, with regard to the proposed application by the Home Government, of POYNINGS Law to Jamaica, in the Seventeenth Century, Mr. LUCAS says:—"Fortunately the colonists were sturdy enough to withstand this inroad on their rights, they refused to accept the laws which were submitted to them." He then says that the case of the Jamaica colonists "was so successfully pleaded in England, that in 1680 the Crown gave way so far as to restore to the Assembly its power of making laws, subject to subsequent approval or disallowance by the Crown." Could the fiercest

denouncer of Downing Street speak more respectfully of the Declaration of Rights made by Lord WILLOUGHBY and the Cavaliers of Barbados in 1651 : in which, among other things, they laid down that they were not bound by the government of a Parliament in which they were not represented : than does Mr. LUCAS, who describes it as "laying down boldly and broadly the principles of colonial "self-government?" How different this from what the oldest inhabitants have told us of colonial administration, when the Secretary-at-War was also Secretary for the Colonies, and was resentfully called the Secretary-at-War with the Colonies ! Again : although there is a tradition that a Secretary for the Colonies has, in modern times, profanely spoken of Demerara as an island, things are so much improved that no statesman would now-adays be entrusted with the Colonies, who was so ignorant of them, and cared so little for them, as that PELHAM, Duke of Newcastle, who, in the last century, for some twenty four years was master of their destinies. He thought Jamaica was in the Mediterranean, and that New England was an island. Told that Annapolis ought to be defended, he said "Annapolis ! Annapolis ! Oh "Yes ! Annapolis must be defended ; to be sure Annapolis must be defended—where is Annapolis?" Some one informed this droll placeman that Cape Breton was an island. He exclaimed "Cape Breton an island. "Wonderful !—Show it me in the Map. So it is, sure "enough. My dear Sir, you always bring us good news. "I must go and tell the King that Cape Breton is an "island." OXENSTIERN'S apothegm as to the little wisdom with which the world is governed, was palpably exemplified in the case of the noble Duke. In our own

day, the Colonies are allowed to a great extent to shape their own destinies, and this of itself preserves them from the evil results of ignorance. Colonists and Governors are the contestant parties, in fact, though not always in appearance ; and the Secretary for the Colonies acts the part of a beneficent umpire, when called upon to intervene, by the protest of the Elective Members of the Colonial Council. All the same is it pleasant to our pride as Colonists, to find our Colonies are being written about with competent knowledge. The ignorance that yet prevails in England about British Guiana, whose territory is as large as Great Britain, is really prodigious. It was but in the latter part of 1890 that a Colonist, on a visit to the Old Country, was asked by a clergyman—a University man—whence he came. Answered, "From British Guiana" the parson did not know the place. "Perhaps you may know it by the name of Demerara, "where the Crystals come from"! said the Colonist, confidently. "Ah, there you have me out of my depth!" was the rejoinder. The parson lived in Lancashire, in which is Liverpool, a city which has some trade with British Guiana. Nevertheless, Mr. LUCAS tells us that Demerara Sugars have "a world-wide name."

Besides sketching the history of each Colony, from its first settlement down to our own day, Mr. LUCAS gives a separate chapter upon European Colonisation in the West Indies. In this he has focused the results of the four centuries which have rolled onwards since the coming of COLUMBUS. How the English, the French, and the Dutch, broke up the monopoly of the trade in the West Indies, which the Spaniards assumed to be all their own : how the Danes and the Swedes came to have a

foothold in the Caribbean Sea : these things will be found pithily put, in the volume before us. How the islands, and the colonies on the mainland, were settled, and changed hands, from time to time, at the sword's point : how, by treaties, they were restored, or exchanged : are clearly set forth. Of those fierce aborigines, the Caribs, and of their gradual extinction, one may read herein. Of white labourers imported to till the fields : of negro slavery, and of the slave trade : and of the emancipation, and of coolie immigration, there is something to be learned. The sugar industry is traced, from its introduction into Barbados to its present condition of depression. Any one of these subjects would of itself form a pleasant theme for discussion. It is not with West Indian History, however, but with Mr. LUCAS' book, that we have to concern ourselves.

Besides the History and the Geography of the West Indies, both of which are pleasantly treated of, the book describes the various constitutions, from the freeborn Englishman type existing in Barbados, where, as Mr. LUCAS says, the House of Assembly is " next to the " House of Commons and the Bermudian House of " Assembly, the most ancient and characteristic Legisla- " tive Body now existing in the Queen's Dominions," down to the Crown Colony system evolved from Martial Law. The character of the law in operation in each Colony, and the manner of its administration, are noted. In this connexion it may be mentioned that an appeal lies to the Supreme Court of Jamaica, from a decision of the Supreme Court of British Honduras : a survival of the former state of dependency of the latter, upon the former Colony. The Finances of the several Colonies receive

attention, and Education and Religion are not forgotten. At the end of each chapter is a *General Summary*, in which the author endeavours to show the special position in the British Empire of the particular Colony treated of. Miniature maps accompany the letter-press. The Map of Tobago is manifestly defective, for, as we read on page 260, the surface of the island is for the most part "broken and hilly," a fact which the limner has failed to show. The Map of British Guiana bears a *Note* atop, in the following words: *The Boundary line shown on this Map, on the West, is the provisional minimum line adopted by the British Government in 1886, and usually known as the Schomburgk line.* In describing, in his chapter upon British Guiana, the divisions of the vast country of Guiana, of which this British Colony forms part, our author writes: "It may be said broadly that the Orinoco formed the boundary of Spanish Dominion, though not of Spanish Claims, on the North Coast of South America, while the Amazon was the limit of the Portuguese in Brazil. Between them Dutch, French, and English found room to trade and to settle, and at the present day all three nations own provinces side by side, each of which bears the name of Guiana." As regards the Northern Coast of South America, which was the *Spanish Main* of yore, Mr. LUCAS observes that, "in tracing British Colonisation and the rise of British Colonies in the West Indies, the first point to remember is, that here the circle of British Expansion intersected the circle of Spanish Dominion."

In reading the book before us, we cannot but find that these Colonies have much in common, besides the pro-

duction of sugar. Let us first discuss the weather, that non-committing topic of conversation. So various are the figures given of the rainfall of the several Colonies, that one would question the accuracy of the rain-gauges used, and the want of uniformity in the conditions of using them. In Jamaica, the mean annual rainfall is given at 66 inches. In the Leeward Islands, Antigua shows an average of 45 inches: Dominica 70 inches. That of St. Kitts is not stated. The rainfall of Barbados is said to show an annual average of 80 inches. In the Windward Islands, the annual mean of St. Lucia is given as $83\frac{1}{2}$ inches, that of St. Vincent as 'at least 100 inches', and that of Grenada as 85 inches. On the windward side of Tobago, the average annual rainfall is said to be about 65 inches. As regards British Guiana, Mr. LUCAS says, that the annual rainfall at Georgetown is about 70, which is 10 inches less than he gives to Belize, the capital of British Honduras. As we have heard that the short rainy season in British Guiana is said to last three months, and the long rainy season nine months, its inhabitants need not be concerned at the higher rainfall attributed to Barbados.

Colonists of British Guiana will be gratified to find it noted of their sugars that they were the first West Indian Sugar to be brought into the English market, "ready for consumption without further refining, and "they have been taken as a standard by Sugar-growers "and Refiners elsewhere." The author has but cold comfort to give West Indians as regards the bounty system. Of the present outlook he writes: "Of late "the bounty system, which has been adopted by foreign "governments, has further injured the West Indian

"Colonies; and depression is hardly to be wondered at in islands, which within a short space of time have passed from the phase of protective duties in their own favour, to that of free and open competition with the rest of the World, and again to a phase in which they are actually handicapped as against foreign countries." Himself a rampant Free-Trader, our author, not unnaturally, betrays a kindly feeling for those pioneers of Free Trade, the Buccaneers of America. "They were savage opponents of all monopoly" says Mr. LUCAS, "and their freebooting was a declaration written in fire and blood, of the right and of the advantage of Free Trade in the New World" (p. 58). Again, in treating of the settlement of British Honduras, he states that, "the woodcutters and settlers in early times were closely connected with the Buccaneers, and here as elsewhere these unlicensed free traders largely helped on the building up of the British Empire in the West Indies" (p. 317). So long as cheapness is to be worshipped as a fetish, so long must the operations of the Buccaneers be regarded with respect. They knew that the argument as to cheapness favoured the purchase of stolen goods. They worked it out to its logical conclusion, and found that cheapest of all was it for them to steal the goods. And what a Bounty System they had! There was another side to this, however. The Spaniards could hardly have had the same appreciation as that entertained by Mr. LUCAS, of "the right and of the advantage of Free Trade in the New World." Guilty of over-trading in territory, the Spaniard's engagements were greater than he could meet. But, had the Don's power of Protection been equal

to his pretensions, Spain had not been, step by step, evicted from the continent of America. The Spaniard failed, not on account of Protection, but from the want of it.

The growing tendency of the British West Indian Colonies to trade with the United States becomes, year by year, a palpable fact. This is seen at present, chiefly in regard to the Sugar exported from the Colonies. As regards imports, Colonists have long been dependent for their breadstuffs, tobacco, and some other goods, upon the United States. Slowly, but surely, manufactured articles are being added to the list. As the Great Republic develops its manufactures under the ægis of a protective policy, so surely will its people enter upon the business of supplying these Colonies with dry-goods, and other merchandize which we at present get from the United Kingdom. Here is what Mr. LUCAS tells us of these trade relations—of the Americanisation of our trade, in fact. The Bahamas, “like the Bermudas, deal mainly “with the United States, send their produce to American “markets, have their mail communication chiefly with “American ports and in winter time welcome numbers “of American visitors to Nassau.” The trade of Jamaica with the States “has largely developed since 1883, and, “as regards exports alone, is now greater than the “trade with the mother-country. In 1887–8 the United “States sent in 27.7 per cent. of the imports and took “43.2 per cent. of the exports.” In the Leeward Islands trade is tending “more and more to pass” to the United States. Efforts are, in fact, now being made in that quarter to develop a trade with the States in tropical fruits. The imports of Barbados from the United King-

dom and the United States "have of late years been "fairly equal; but, for the last two years, considerably "more than half the total exports have been taken by the "United States." The export trade of St. Lucia is described as being "curiously irregular in its direction, "varying between the Mother Country and the United "States." St. Vincent sends most of the arrowroot exported, to the United Kingdom, and the greater part of the sugar, to the United States. British Honduras holds communication with Europe "mainly through the "United States, though there is a line of British "steamers running to Belize." We are told that, next to timber cutting, which is the colony's mainstay, "fruit "growing for the American market is the most important industry of the colony." In 1888, the value of the fruit so sent was more than one-eighth of the total value of the exports. The trade "has grown with the "establishment of regular steam communication, British "Honduras supplying New Orleans just as Jamaica supplies New York." The United Kingdom and the United States divide between them five-sixths of the total import and export trade of the colony, Great Britain "still "taking the larger share." That the exports of Trinidad and Grenada still tend towards the United Kingdom, is readily accounted for in the fact that these colonies produce larger quantities of cocoa, and that the best markets for cocoa are to be found in Europe. The trade of Grenada with the Mother Country is said to have, relatively, reached larger proportions than has that of any other West Indian colony. The United States "contribute a considerable share of the imports, but "take hardly any part of the exports." In the case of

Trinidad, but for the attraction of cocoa towards the English market, there would probably be an excess in the value of exports to the United States. As it is the value of the trade with the United Kingdom in 1888 was about a million and a half sterling, and that with the United States, a million. As an indication of the tendency of trade, in the future, it is noticeable that the tonnage of ships entering from, and clearing for, the States, is said to be "much larger than that of ships trading direct to Great Britain." Of British Guiana, Mr. LUCAS says, "though the trade with the United States seems to be increasing, British Guiana still deals mainly with Great Britain. In 1888, 60 per cent of the imports came from, and 49 per cent of the exports were shipped to the mother country. The imports from the States in that year were but a third of that from Great Britain, while the exports to the American Markets were 38 per cent. of the whole." As a supplement to these figures, it may be stated that British Guiana exported in 1889, to the United Kingdom, produce of the value of £1,287,000, and to the United States, of the value of £878,000. In 1890, such exports amounted to £937,000 to the United Kingdom, and to £948,000, to the United States. This tendency of the West Indian Colonies to trade with the United States is but the inevitable result of the Free Trade policy which Great Britain has so carefully protected. Should West Indians accept the logic of facts, this tendency of their trade may powerfully affect decisions as to future contracts for Mail communication with the Mother Country. Hitherto, sentiment on the part of the Colonists has blinded them on the question of subsidy. They may,

hereafter, be more sparing with their sentiment and more saving with their money: and, the more so, when they come to realize that the Royal Mail Steamers would still run, even though the Company had not the Contract.

Of Fiscal matters there are some facts worth noting. In Trinidad there is an export duty upon Sugar, by way of meeting the Planters' share of the cost of introducing agricultural labourers. A similar tax prevailed in Jamaica up to April last, when it was abolished. A part of the revenue in the Turks' Islands is raised by a royalty upon the salt exported. In the Caymans there is a poll tax, as well as a tax upon cattle. Export duties have been replaced by a land tax in Antigua and St. Kitts. Dominica is said to luxuriate in an income tax and a poll tax. The latter is levied "in commutation for labour on the roads, the remains of the old French *corvée*." While the finances of Antigua are "always flourishing," and those of Montserrat "maintain a constant equilibrium," those of the other islands of the Leeward Government give cause for anxiety, as their resources "appear to be more subject to failure." Dominica, especially, must be an uncomfortable Colony to finance for, seeing that between 1883 and 1887, its revenue fell off by more than 25 per cent., although we are given the assurance that the island's finances have recovered somewhat of late. The Virgin Islands are "weighted with an accumulated deficit." For even the impecunious Colonies there is, however, hope of securing an equilibrium, as that productive source of revenue, the Excise duty upon Rum, is stated to be "only partially collected" in the Leeward Islands. The tariff of Trinidad is said to be higher than that of any other

British Colony in the West Indies, with the exception of that of the Turks' Islands. Upon the asphalt exported from Trinidad, a royalty is paid. St. Vincent revels in an income tax, and Tobago can boast of "a heavy land tax." With a population of about 1,660,000, the British West Indies: that is to say, the Island Colonies, and those of Guiana and Honduras, on the Continent, are happy in a yearly Public Expenditure of some £2,080,000, and in an accumulated Public Debt of some £3,160,000. In the Colonial period of the United States, Colonel LOVEFACE, when Governor of New York, gave expression to a political nostrum, the latter part of which appears to find approval with colonists so soon as they acquire the right to tax themselves. That worthy said: "The method of keeping the people in good order is "severity, and laying such taxes as may give them "liberty for no thought but how to discharge them." So it was with the North American Colonists. They resisted, to the death, slight taxation imposed upon them by the Parent State, and, to resist effectually, they voluntarily imposed upon themselves the heaviest of taxation. West Indians are evidently trying to live up to the LOVEFACE ideal.

In the reign of WILLIAM and MARY, the Bishop of London's Commissary in Virginia, had much trouble in getting the Attorney General of England to pass the necessary patent for the establishment of a College in Virginia. BLAIR, the Commissary in question, appealed to the unsympathetic lawyer, on the ground that the College would serve for the education of men who afterwards should, as clergymen, work for the saving of souls. "Souls!" exclaimed the Attorney General,

"Damn your souls! Make Tobacco!" So changed are times now, that, not only do Imperial Statesmen believe that Colonists have souls, but they are always anxious that Colonists should receive the advantages of education. Let Mr. LUCAS tell us what the schoolmaster is doing among our neighbours. In the Bahamas, Elementary Education seems to be duly provided for, by thirty-six Government free schools besides others receiving grants in aid: but, apart from private enterprise, there are no facilities for higher education. The Colony, however, enjoys the possession of a Board of Education, a privilege of which British Guiana was so ruthlessly bereft in recent years. In Jamaica, the system of grants in aid prevails, but education is said to suffer much from the want of good teachers. In Grand Cayman, a dependency of Jamaica, "schools are not wanting." In the Turks' Islands, they actually have an Education Ordinance, and free unsectarian elementary schools are supported by the Government. Notwithstanding that education in the Leeward Islands is favoured by being under the management of the Federal Government, it is described as being "backward in all parts of the Colony." The schools are mostly denominational, receiving annual grants in aid. In higher education, Barbados is said to stand far ahead of the other West Indian Colonies. In the Windward Islands, the State of Education is "somewhat backward." In Trinidad, Primary Education has from time to time been "the subject of heated controversy," as between Protestants and Roman Catholics. The schools in Tobago are such as have been established by religious bodies, and are subsidised by grants in aid from the

Government. The progress of education in that island is, however, "checked by want of funds and want of "regular inspection." In British Honduras the grant in aid system prevails, and the Colony enjoys the advantage of having a Board of Education, with an Inspector of Schools to boot. The following is what Mr. LUCAS has to say of education in British Guiana :—"Of "the whole population of the Colony the large majority "can neither read nor write. Education has not as yet "made striking progress, and the system at present "is mainly denominational. There are about 160 "schools in the settled districts, and some half dozen "schools for the Aboriginal Indians. There is also a "Government College at Georgetown, to which is "attached an annual scholarship, tenable for three "years." The bald statement as to the inability of the majority to read or write is very misleading. Of that majority, it is well known to those on the spot that most of the unlettered have been "imported so," from India. Education has made great progress among the native born people. In Barbados alone is there to be found a school, Harrison's College to wit, "of the type of the large English Public Schools." There is room, and to spare, for Industrial Education, throughout the West Indies.

Amongst those who call themselves Christians, there are as many divisions in the West Indies as in other parts of the Empire. The want of uniformity in religious matters would have sorely vexed the soul of that good man Archbishop LAUD, with his keen scent for "schismatics." In order to mend matters in New England, which had become the receptacle for dissent, His Grace

is said to have entertained the design of sending a Bishop over them, "for their better Government," and proposed "to back him with forces to compel, if he were not otherwise able to persuade obedience." In our happier times, when troops are being withdrawn from the Colonies, the more politic course is followed of making grants of money to the several bodies of Christians, where the Church of England is itself not disendowed. Notwithstanding that State-aid has been withdrawn from it in Jamaica, Antigua, and St. Kitts, the Church of England is still strong in those Colonies. In Jamaica the Church has capital funds amounting to £60,000. It shares with the Wesleyans and Baptists the religious instruction of the Turks' Islands, and looks after the remnant of those in the Bahamas who do not belong to those two religious bodies. In British Guiana it is "established," as also in Barbados, where "the large majority belong, and always have belonged," to it. In St. Vincent and Tobago, about half the population belong to it, and in Grenada about a third. It holds its own in Trinidad, where its members are influential though not numerous. In British Honduras, "the numbers of its adherents have never been very large." The Presbyterians have a considerable following in Jamaica, and in British Guiana also, where their Church is "established." The United Presbyterians provide for the religious wants of Grand Cayman. The Moravians are strong in Antigua, and considerable in Jamaica. They enjoy a small grant in Barbados, and have a footing in Tobago and British Guiana. The Wesleyans and Baptists, whose Missionaries were "the first and most active workers amongst the slave population," and whose

earlier efforts were met by persecution, have established themselves. They flourish in the Bahamas. In Jamaica, they rank in importance after the Church of England. In Turks' Islands they hold a first place. In Barbados and British Guiana the Wesleyans receive small grants. About one third of the inhabitants of St. Vincent come within their fold. In Antigua, St. Kitts, Grenada and Tobago, they are considerable in numbers. In British Honduras, they are the most numerous of the Protestant denominations. The Church of Rome is predominant in numbers in the Colonies conquered from France and Spain, and in Montserrat, where Irishmen settled in large numbers in old days. Hence it is that, in Montserrat, the majority of the people are Roman Catholics, and in Dominica, almost the whole. They are predominant in numbers in Trinidad, St. Lucia, and Grenada, and form about half the population of British Honduras. Roman Catholicism is "almost unknown" in the Bahamas. In Jamaica, Roman Catholics, are "among the smaller "congregations," and, in Barbados, they form a very limited body. In British Guiana, with numerous Portuguese adherents, they form an important element. With the continuous flow of immigration from the East Indies, the religious bodies in the West Indies need never want work to do, if they do not already find their hands fully employed with their own flocks. If only as moral teachers, the several Christian Churches, do much for the welfare of the West Indies.

The recent withdrawal of the troops from some of these Colonies, with the object of concentrating the British Forces at St. Lucia, cannot but be regarded as a right step, however unpleasant it may be to the places

thereby divested of garrisons. As Mr. LUCAS states, the strategical importance of St. Lucia caused it to be fought for fiercely by French and English. RODNEY set great store upon it; and General NOGUES, one of BONAPARTE'S officers, in a report to the First Consul, proposed to transform the island into "the Gibraltar of the Gulf of Mexico." To give full effect to the proposed conversion of St. Lucia into a place of arms, it would seem desirable that the Colony should be constituted into a distinct government, with a military man as Governor and Officer commanding the troops at the same time, and with a Lieutenant Governor, as in Malta, to carry on the civil administration. In such circumstances Dominica would appear to be a natural adjunct of the government of St. Lucia. As most of the West Indian Colonies are now being brought face to face with the question of Defence, it is pleasant to read the instances mentioned by Mr. LUCAS, of self-reliance in the past. In the chapter upon *The Bermudas*, he writes:— "When the Spaniards in 1710 attacked the salt-rakers "at Turks' Islands, the Bermudians drove them out, "unassisted from home, and armed their own vessels to "protect the trade in future. Similarly, at a later date, "ships were fitted out to guard the Islands against French "privateers." The capture of New Providence, in the Bahamas, in 1783, from the Spaniards by an expedition fitted out at his own expense by Colonel DEVEAUX, and led by himself, was, indeed, gallantly done. The Bay-men of Honduras by their brave defence of their settlement in 1798, decided that Honduras should once for all be a British possession. The Barbadians not only beat off DE RUYTER in 1665, but have from time to

time contributed substantial contingents to expeditions sent against the enemies of England in the Caribbean Sea. It would be well that the services of the Colonial Militia should be distinctly brought out in subsequent editions of the *Historical Geography*. They did not escape notice at the time from the military commanders. *Did the Militia fight?* asked WASHINGTON, when news was brought him of the fight at Bunker's Hill. Told of the stand they had made, he exclaimed, *Then the liberties of the Country are safe*. West Indians have henceforth to rely, in the first place, upon native swords and native ranks for their defence from foes, whether foreign or domestic. If our men be but properly trained, and properly led, there need be no fear, but that the Militia of our time will fight as well as did the Militia in the days of our forefathers. They will thus become an important auxiliary to the British soldiers and sailors, who will be soon at hand to succour them.

While maintaining the general accuracy of the historical portion of the work before us, there are some statements which we cannot allow to pass unquestioned. In the first place, as to the true date of the actual settlement of Barbados. As will be seen by the statements of some of those who went out in the ship which carried the first settlers, it was in the year 1627, that Barbados was colonised for the first time. Some of those statements are published in the present number of *Timehri* (pp. 51-60). LIGON leaves the date blank, but OGILBY, whose work was published in 1671, gives the year 1627. In many other printed books the same year is given. The year 1625 is given by the author of the *Memoirs of*

the first settlement of Barbados, and by the numerous pilferers from his work. The error is not the only one in that book. As a reason for adhering to this latter date, Mr. LUCAS alleges the alternative name of James Town given to The Hole, the place where the first settlers planted themselves. Unfortunately for this theory, the name of James Town was only given many years after the settlement. Moreover, it was first called St. James's Town, from the parish in which it lay. Parishes were not constituted, in Barbados, until Sir WILLIAM TUF-TON'S time. Writing on the 31st of May, 1670, Colonel ROBERT RICH, who had been an inhabitant of Barbados for more than eleven years, says :—"The third Road and Town is lately called St. James's, formerly the Hall" (*sic*).^{*} Oldmixon (*Vol. II, p. 100*), says of The Hole, "It has a regular and handsome church dedicated to St. James; from whence it is sometimes called Jamestown." Another reason for bringing the date of settlement within the reign of JAMES I, is found by Mr. LUCAS in the fact that in a petition, dated the 13th September, 1685, it is alleged that the island "had its first beginning to be settled under King JAMES the First." With regard to this it may reasonably be accepted that the petitioners, like others after them, considered the landing of Captain CHARLES LEIGH and his company, from the *Olive*, in 1605, as an act of settlement. Even as lately as in 1891 the *Colonial Office List* gave the date of the settlement of Barbados as the year 1605.

Another statement which must be questioned is the oftentimes repeated fiction that the Earl of Marl-

^{*} Ogilby, p. 378.

borough had a patent for Barbados (p. 329). There is no such grant on record. The second Earl of Marlborough, who prosecuted his own and his father's claims, never suggested that there was one. What he did say, and did prove, as Lord CLARENDON tells us, was, that his father had received a *promise of a grant* of Barbados, and that, on the father's foregoing his claim, Lord CARLISLE bound himself to pay £300 a year, from the revenues of Barbados, forever, to the father and his heirs.† In stating (p. 187), that, in 1649, the negroes were sufficiently numerous to attempt a rebellion, Mr. LUCAS has fallen into an error, which it is high time should be exploded. The rebellion in question was not by negroes, but by white servants. A reference to LIGON'S History (pp. 43 to 45) will make this, as LIGON himself would have said, "plain as a packstaff." It is only on page 46 of his History, that LIGON begins to treat of the negroes. Papers relating to the intended rising of the white servants—for they were betrayed by one of their fellows before they could accomplish their purpose—are preserved in the House of Lords. In the chapter upon Trinidad, Mr. LUCAS, in a foot note to p. 234, claims for that Colony that, "before "the end of the sixteenth century, Trinidad Tobacco had made a mark in European markets." In support of his averment he quotes from *Scene 2 of Act III*, of BEN JOHNSON'S *Every man in his humour*, the words, '*Tis your right Trinidad*, used by Captain BOBADILL. But, there were other places of the same name, within the Spanish West Indies, notably Trinidad in Cuba. That the island of Trinidad, now a British possession,

† See Life of Lord Clarendon Vol. III., p. 936.

was not the place referred to, seems clear from the fact that, in the same scene, and in connection with the tobacco in question, St. Domingo is referred to. When Captain BOBADILL asks for his match, CASH exclaims, *Would his match and he and pipe and all, were at Sancto Domingo!* One cannot but demur to Mr. LUCAS' description of Jamaica (p. 124) as "the great point from which British Fleets set out for war or peace in West Indian Waters." The historic rendezvous of British Fleets in the brave days of old was Carlisle Bay, Barbados. Thence it was that, in 1651, Captain DENNIS sailed, in command of a squadron of the State's ships for the reduction of Virginia to the authority of the Commonwealth. Thence, in 1652, Sir GEORGE AYSCUE proceeded to the Leeward Islands, to receive the submission of the colonies of Antigua, Nevis, and St. Christopher. Thence in 1655, 'His Excellency ROBERT VENABLES and the Right Honourable WILLIAM PENN' set forth on their expedition against Saint Domingo, which resulted in the capture of Jamaica. Thence, in 1667, Sir JOHN HARMAN twice set sail, doing much damage at Martinique, on the first occasion, and, on the second, capturing Cayenne and Surinam. Thence did Admiral BENBOW make sail, once, to suppress the buccaneers, and, a second time, to battle with the French. Thence, on several occasions between 1762 and 1782, did RODNEY put to sea to fight the foes of England, and notably so, for that life and death struggle with DE GRASSE, off Dominica, on the 12th of April 1782, when his glorious victory not only saved Jamaica as a British Colony, but enabled Great Britain to secure peace the year after. From Carlisle Bay in 1778, Admiral BARRINGTON and

General GRANT, sailed for St. Lucia, which they took from the French after bloody fighting by sea and land. Thence, in 1793, sailed Admiral GARDNER and General BRUCE, for the support of the Royalists of Martinique and Guadeloupe. Thence, in 1794, went forth Sir JOHN JERVIS and General GREY, on their victorious expedition against the French in the Leeward Islands. Thence in 1796, Sir HUGH CHRISTIAN and Sir RALPH ABERCROMBY sailed for the conquest of St. Lucia. Thence, in 1796 also, Commodore PARR and General WHYTE, and, in 1803, Sir SAMUEL HOOD and General GRINFIELD, went forth to receive the surrender of the Dutch Colonies which now, together, form British Guiana. Thence, also, Sir ALEXANDER COCHRANE and Sir GEORGE BECKWITH, sailed in 1809, for the conquest of Martinique, and, again, in 1810, for the conquest of Guadeloupe. From Carlisle Bay, on the 5th of June 1805, put to sea Lord NELSON, in the *Victory*, in his eager chase after the allied fleets of France and Spain, commanded by VILLENEUVE and GRAVINA. The enemy had almost twice the number of ships in the English Fleet, but NELSON was in command of the latter. There was need for hot haste in pursuit, for the safety of England was at stake. If VILLENEUVE could but carry out the behests of NAPOLEON, then 150,000 troops encamped in the neighbourhood of Boulogne would cross the Channel in 2,000 vessels, lying ready, for the invasion of England. NELSON himself was sure that VILLENEUVE was at Martinique. Misled, by wrong information, he sailed for Trinidad in quest of the enemy. When news reached Martinique that NELSON had arrived at Barbados, the

French and Spanish Admirals fled forthwith to Europe. NELSON'S name alone affrighted them. He followed but did not overtake them. But four months later, these same French and Spanish Fleets, joined by fresh ships, and NELSON, also reinforced, fought at Trafalgar. Many another gallant British fleet has set out from Carlisle Bay, for the performance of glorious deeds. Such frequent use was made of their island as a place-of-arms, that the Barbadians, in the character of the fly on the wheel, came to look upon themselves as of the utmost importance to the Empire. PINKARD tells us that it was a saying with the Islanders, *What would poor old England do, were Barbados to forsake her?*

Bartica : A Reminiscence.

By Henry Kirke, M.A., B.C.L., Sheriff of Demerara.

THE Preamble to Ordinance No. 5, of 1887, states: "Whereas it has become necessary to provide for the establishment and regulation of a Town at the Confluence of the rivers of Essequibo, Massaruni and Cuyuni, and whereas the lands at the point of such confluence known as Bartica Grove have been granted for ecclesiastical purposes to His Lordship the Bishop of Guiana and his Successors in the See during the pleasure of the Crown; and whereas it has become expedient to resume all interest in the said lands" etc. etc. The question naturally arises, why has it become necessary to establish and regulate a Town at Bartica? For years Bartica has slumbered placidly amongst its groves of palms and mangoes and never saw any necessity such as the Ordinance suggests. Magistrates have come and gone, and held Court in the old ever-falling but not yet fallen Court-house: Chaplains and Curates have ministered in the quaint little Church of S. John with its pretty but too short Avenue of Royal Palms: but the thought has only lately arisen in the minds of our Legislators, that it is necessary that there should be a Town at Bartica. What has caused this necessity for a Town? What called Melbourne into being, and clothed the beach which faces the golden gates of the Pacific with palaces? Gold! that magic monosyllable which when of old breathed softly into the ears of man made him rush forth in his thousands with

pickaxe and spade—abandoning home and hearth in a wild search for wealth. Gold! which has done more of late years to build up cities and people deserts than any other agency. When the first rumours of Gold having been found in the Cuyuni, were succeeded after many years by the actual discovery of gold in paying quantities in the Essequibo—when the Puruni was found to be a mine of wealth—and the Potaro with its neighbouring creeks was described as a very Pactolus—then it was found necessary to establish some Central Depôt from whence the Gold Industry could be regulated; a place where labourers could be registered when going up to work and searched when coming down; where boats could be inspected and licensed, and competent boat hands hired; where the Magistrate could adjudicate on the gold disputes, and the Government officers could issue prospecting and other licences; where a hospital for the sick could be established and a lock-up for the disorderly; where the dead could be buried and the living entertained; so Bartica was chosen and founded and will soon be able to meet all the requirements detailed above. A glance at the Map of Guiana will convince the most sceptical what a wise choice has been made. The gold area seems to be very widely distributed but there is no doubt that the bulk of it is embraced in that wide stretch of the Colony which is drained by the Essequibo, Massaruni and Cuyuni Rivers and their tributaries; so that all the traffic to and from these auriferous districts will be by means of these rivers, or by railways, or roads constructed on their banks. The three rivers converge at Bartica and the vast flood of their united waters is borne on the bosom of the Essequibo, past her hundred isles

into the great basin of the Atlantic. It is true that gold has been found in the Barima and Barama rivers and also in the Upper Demerara, but Georgetown can supply all the wants of the latter district whilst no doubt, a suitable place in the North-west will be found for a Central Station, when the output of gold in the district should make it necessary for our legislators to move again. Some of the greatest cities of old and modern times owe their rise and grandeur to their positions in the fork between two great rivers, which gave them unrivalled advantages for defence and commerce. LYONS and ST. LOUIS are two of the most striking modern examples, and there is no reason to doubt that in years to come Bartica will rival those great centres of trade and civilization:

As the visitor passes up the avenue leading to the church at Bartica, he will see an unpretentious monument on his left hand, erected to the memory of the Revd. Mr. PIERCE and his family who perished some years ago in the rapids of the Essequibo, giving a mute but solemn warning to all who would seek to penetrate into the wilds in search of wealth—a sermon in stone not to be disregarded. All the three great rivers which centre at Bartica are sown with rapids, whose rocks like the dragons which guarded the fabled gardens of the Hesperides, are ready to tear in pieces the rash intruder who attempts to grasp the golden fruits. In these dangerous passes many a life has fallen a victim to the lust for gold; many a promising venture has been wrecked ere it came near its basis of operations. It would seem sometimes as if the old Indian legends were true and these rushing waters were peopled by water-mammas or

other water sprites which dragged down into their horrid depths all those who attempt to pass them without due propitiation. Several suggestions have been made to avoid this loss of life and goods, the most reasonable of which seems to me to build a light narrow gauge railway past Bartica up the left bank of the Essequibo until the rapids are past, when there would be smooth water up to the Potaro and other gold bearing Rivers and Creeks. This railway would open up a district full of valuable timber; and would be available for the timber cutters as well as for the gold diggers. With its terminus at Bartica it could also be connected with the stelling at which the steamers of the SPROSTON fleet are moored, and with other stellings at which timber and the various products of the forest could be shipped direct to England and Foreign countries. If the first Railway were a success a branch could be run up the right bank of the Massaruni past Calacoon, skirting the Marechal falls up to the Puruni gold-fields and if our neighbours in Venezuela will lay aside the sword and take to the pick-axe and shovel, might be connected with a line from the Yuruari valley and bring the wealth of that great district through the channels of the Essequibo to the port of Georgetown. Perhaps the Venezuelans have already abandoned warfare for agricultural pursuits, for Mr. MCTURK tells me that he saw five Venezuelan Generals working as labourers, and a Field Marshal looking after his Master's asses, in which occupation like SAUL the son of KISH, he may find a kingdom.

A Commission consisting of four members of the Combined Court has been appointed to report on the best method of opening up the Country to the gold-

fields ; and the majority of them headed by the Lieut-Governor and under the guidance of that veteran bushman Mr. MCTURK, are now, as I am writing, exploring the country between the Demerara and Essequibo rivers and visiting the gold-fields in the neighbourhood of the Potaro. The colony has confidence that these gentlemen will find a solution of the present difficulties of locomotion, and inaugurate a system of railways which may eventually bring us into touch with our neighbours on this great continent of S. America.

Golden dreams ! my gentle reader may exclaim ; but does he remember that in 1835 MELBOURNE was a desert where now a gigantic city shelters half a million inhabitants, nearly double the whole population of this colony ; that where there was not a single mile of railway, there are now 2,341 miles in full operation. These results are almost entirely owing to gold, so why should not Guiana look forward to a great future from the same cause.

I paid a visit to our future gold-town a short time ago. Its situation as I have said is admirable though the land near the river is rather low and requires drainage as the high spring tides swamp the lowest lots, but as the town extends inland the ground gradually rises until elevated sites are reached upon which will be reared the homes of our future merchants. The limits of the present town are confined, the whole area laid out being only about half of a square mile, but it can be expanded on three sides, to meet the necessities of trade and population. The Town has been divided into lots, most of which have already found purchasers. The lots are 7,529 roods in extent. The avenues and streets are

laid out with rectangular regularity and are named in American fashion, First, Second, Third Avenue, and crossed by First, Second and Third Street; at present most of these avenues and streets are simply magnificent distances, unmetalled, unoccupied and surrounded by primeval forest; but we must remember that not many years ago, Washington was described as the "City of Magnificent Distances," a city which is now renowned for the glory of its streets, and its stately buildings both public and private.

However a start has been made already. Bartica can boast of two or three decent hostels, an extensive market—at my visit destitute of things marketable, unless about fifty black men in hammocks could be reckoned in that category—a dispensary, several good stores and—perhaps unnecessary to add—thriving rum shops. There seemed an absence of the female element, except of a certain class, and few children or fowls, but these defects can be easily remedied. The hospital is a large roomy edifice just approaching completion, and a broad draining trench has been dug round the future city, the waters from which will pass through a koker of sufficient depth and dimensions to drain a large sugar estate. A new Police Station near the present stelling is in course of erection, which will add to the appearance of the Town and the comfort of the Force.

Bartica or "red earth," (probably the same red earth from which according to the Talmud man was first created), was originally granted for religious uses. It was one of the earliest Missionary Settlements in the Colony under British rule. The original site was about a mile to the West of the Grove, where a grant of land

was obtained from Sir BENJAMIN D'URBAN. The Mission was removed to its present position in 1837, when a grant of 560 acres was obtained from the Crown. Under the fostering care of the Revd THOMAS YOUNG, the Mission obtained a certain amount of success; it was visited by Bishop COLERIDGE of Barbados in 1836 and a church was built, dedicated to S. JOHN the Baptist—the Evangelist of the Desert—and consecrated by the Lord Bishop of Guiana on the 5th January 1843, in the presence of Governor LIGHT and a distinguished Company.

But the Church must give way before the march of modern progress. Our indefatigable Primate has however taken care that a large plot of land shall be reserved for Church purposes where Schools and Parsonage House can be built, where, no doubt, a stately fane will arise in years to come, erected to the glory of God, and out of the pockets of the Merchants of Bartica; and where many generations of Barticans will find their last resting place when the fitful fever of life is over, and the gold which they must leave behind them has become to them valueless.

I doubt whether in any part of the world can be found such an unrivalled site for a city, as Bartica presents. Washed on two sides by the waters of two great rivers, she faces the Atlantic breeze tempered by a passage of twenty miles over a hundred isles clothed in tropical verdure. To the north stretches a mass of fresh water fed by Essequibo, Massaruni, Cuyuni and their myriad tributary streams, so as to make a great inland lake, dotted in all directions with islands varying in size from huge Hog Island, nearly as

large as Barbados, to the lovely little Sail Rock, smallest of small islands, but said to be the most densely populated in the world, for in its solitary tree hangs a huge nest of ants. To the south stretch two thousand miles of almost virgin forest and savannah intersected by ranges of hills and deep rivers broken by many a thundering fall and noisy rapid : forests rich in greenheart, mora, balata and odoriferous gums ; savannahs which will support cattle by thousands ; hills rich in gold which for myriads of years have been awaiting the pick of the miner ; rivers whose banks are gleaming with golden showers, richer than those which deceived Danaë of old.

Seen even now in the early morn bathed in sunshine more golden than her dreams, she seems a fairy village, all sordid details are effaced, all common objects are transfigured and nothing but beauty in colour and form remains. The mangoes with their varied tints of green and russet, the towering Royal palms, the cocoanuts with fronds of every shade from gamboge to burnt sienna, the warm-grey houses with roofs of purple wallaba not yet toned down to drab, the numerous little stellingas, each a focus for flashing rays of living water, a score of boats sleeping on the waters, the living crowds of every colour of skin and dress, the brown nude boys and girls bathing on the strand, their lithe wet bodies glowing with saffron tints under the solar rays, above all a sky of scintillating blue reflected in a magic mirror of placid water, all these combined to form a picture of beauty which once seen will never be forgotten.

At present Bartica is in a transitional state which is always in some aspects a disagreeable and repulsive one.

Who ever falls in love with a school girl smelling of slate pencils and bread and butter? What inexplicable nastiness there is in a hobble-de-hoy? a chrysalis is uninteresting, and a tadpole is an abortion: so Bartica with its unfinished houses, its phantom avenues, rowdy diggers and ladies of the demi-semi-monde may be said to be *in transitu* but soon, we hope, to blossom forth in the full sheen of its perfected existence.

Occasional Notes.

By the Editor.

The Sawyer Beetle.—The question as to the species of beetle which is accustomed to saw off comparatively large branches of trees, is not seldom raised; and recently in the columns of this journal, some doubt on the matter was indicated by the late Revd. W. Harper, (*Timehri*, Vol. II. 1888, New Series, p. 77.) To this an editorial note was appended pointing out that of all possible species, the *Prionus cervicornis* was, *par excellence*, the sawyer.

The following note by Sir Robert Schomburgk on the subject, which escaped my attention when writing previously on the matter, bears directly on the point, and is of considerable interest. It is taken from the account of his journey to the Canuku mountains (*Journal of the Royal Geographical Society*, Vol. X, 1841, p. 177.)

Speaking of beetles, he says "One of the most remarkable which inhabits the Canuku mountains is the *Prionus cervicarius*" (misprint for *cervicornis*), "and as an eye-witness, I can confirm the statement of former travellers of its peculiar habit of seizing a branch of a tree or shrub, between its powerful serrated mandibles, and of flying round and round with the rapidity of a windmill, till it has succeeded in sawing it quite through. The branch was nearly as thick as one's wrist, and I only saw the insect at work for about a quarter of an hour: how much longer its task might have taken before we saw it, I cannot say; when nearly cut through the weight

of the branch brought it and the insect together to the ground ; but the wish of the little Macusi boys to capture it lost me an opportunity of observing its further proceedings. This *Prionus* was from $3\frac{1}{2}$ –5 inches in length, and nearly two inches in breadth ; its wing covers of a dark-brown striped with reddish-yellow ; the saw-like mandibles very strong, and 1 inch in length ; the antennæ about $1\frac{1}{2}$ inches. The larva is frequently found in the bombyx or silk cotton-tree.”

As pointed out in my former note, the specimen presented to the Museum by Mr. John Wilkie, is at least 6 inches in length.

Cock-of-the-Rock.—Another observation by Schomburgk on the habits of another of the uncommon Guiana animals, may with advantage be quoted here, the more especially as the characteristic feature referred to is not infrequently called in question. The account is taken from the report of a continuation of the same journey (Journal, R.G.S., Vol. X, 1841, p. 235.)

He says “ We saw a number of that most beautiful bird, the cock-of-the-rock, or rock manakin (*Rupicola elegans*)” = *R. crocea* of modern nomenclature, “ and I had an opportunity of witnessing an exhibition of some of its very singular antics, of which, though I had heard stories from the Indians, I had hitherto disbelieved them. Hearing the twittering noise so peculiar to the rupicola I cautiously stole near, with two of my guides, towards a spot secluded from the path, from 4 to 5 feet in diameter, and which appeared to have been cleared of every blade of grass, and smoothed as by human hands. There we

saw a cock-of-the-rock capering to the apparent delight of several others. Now spreading its wings, throwing up its head, or opening its tail like a fan ; now strutting about, and scratching the ground, all accompanied by a hopping gait, until tired, when it gabbled some kind of note, and another relieved him. Thus three of them successively took the field, and then with self approbation withdrew to rest on one of the low branches near the scene of action. We had counted ten cocks and two hens of the party, when the crackling of some wood, on which I had unfortunately placed my foot, alarmed and dispersed this dancing company.

The Indian, in order to obtain their beautiful skins, looks out for these places of their diversion, which cannot be mistaken ; there he hides himself, and armed with his blow-pipe and poisonous arrows, awaits the arrival of the dancing parties. He does not fire till they are so eagerly engaged, to all appearance, in their sport, as to allow him to bring down four or five successively ere the rest take alarm and disperse. Senhor Ayres told me it would be easy to procure, in the vicinity of the river Uaupes, from two to three hundred skins during the pairing season, when the cocks are more particularly disposed to congregate, and exhibit their beauty in these strange capers, to win the affections of some favourite mate."

Young Rattlers.—In the opening paper of the journal an account of the structure of the rattle in the rattle-snake has been given, together with an account of the development of this curious appendage, as observed in the young rattlers from birth. Since writing the fore-

going paper, it has been possible, from actual observation of these young forms, to trace the development of the rings still further.

On February 5th, the larger of the two young specimens was about $2\frac{1}{2}$ feet in length and possessed four rattle-rings. Since then, two exuviations have taken place, one on Wednesday, March 25th, when an extra ring was added to the rattle, thus making five ; and again, about two months after, on May 27th, when the sixth ring was added.

In the case of the smaller snake, which on February 5th, was about $1\frac{1}{2}$ feet in length, two exuviations have also taken place, at intervals also of about two months between each exuviation. On February 28th, an extra ring was added by change of skin ; and again on May 4th, when 8 rattles were registered in total number. It is noteworthy that in the larger specimen of these two young ones, there are only six rings, three having been lost in early changes ; while in the smaller specimen there are eight, the total number from birth being retained, as shown by the presence of the original terminal button, with which they were born. The larger specimen is now (June 11th) about $3\frac{1}{2}$ feet in length, while the smaller is about $2\frac{1}{2}$ feet.

During early life, these vipers are thus, with free diet, observed to exuviate and thus add to the rings of the rattles, every two months.

Hissing of the Boas.—It is of course a well-known fact, that many species of the larger kinds of snakes, by the expiration of air from the corneous trachea, produce a

peculiarly loud sibilant sound ; but quite recently a very noteworthy case of this was brought under my notice in a land camoodie (*Boa constrictor*) which was brought from Leguan island in the estuary of the Essequibo river. The specimen was about 11 feet in length, and peculiarly thick throughout the greater part of the hinder extremity, so much so as to give rise to the idea that it was a pregnant female, or, at least, a female distended with a large mass of egg capsules. The noteworthy feature was that the snake, peculiarly and unusually irritable, on the slightest disturbance gave utterance to a loud and prolonged hiss, directly caused by a continuous and powerful emission of air from the lungs, which, at a distance of about six yards or so, it was almost impossible to distinguish from the rattling or sibilant sound caused by the vibration of the horny parts of the rattle of a rattlesnake. An interesting problem presents itself, as to the origin of the sound, or of the adaptive modification, in each case; and as to the relation in time which these bear to each other. At present it must be confessed, there is nothing in our grasp which tends to be explanatory of either of these points.

Belostoma gigas.—During the last five years, about three specimens of these large and powerful hemipterous aquatic forms, have been brought to the Museum. Quite recently, after the partial lighting by electricity of some of the streets of Georgetown, these insects have been seen and collected in extraordinary numbers around the arc lamps, while around the incandescent Swan lamps, none have been observed. On almost any night, around the arc lamps, crowds of these large forms will be ob-

served flying towards the light, and settling around the globes, or along the wires, eventually to fall to the ground, attempting to hide themselves, on the approach of day, either under sticks and stones or other projecting objects, or taking refuge in the muddy water along the tramway rails. From one of the least obtrusive forms, this cicada-like insect, through the intense white light of the arc lamps, has been reformed or disgraced, as the case may be, to become one of the most obtrusive and visible results of increased illumination.

Palm Insects.—Various forms of insects, more or less destructive to the life of various palms, have been familiar for a very long time. Perhaps the best known of these are the palm weevils and palm borers of the *Curculionidæ* and *Scarabeidæ* respectively, which, though closely similar in most tropical countries, yet differ in many respects from each other, according to the locality of each form. Mr. H. N. Ridley, Director of the Botanical Stations of the Straits Settlements, has recently published a detailed description of a form of each of these large families, as being particularly destructive to the cocoa-nut palms of the East, while a very similar paper might be compiled relating to the two chief palm borers of the western hemisphere—the *Strategus alæus* and the *Calandra* or *Rhynchophorus palmarum*, the latter of which, in the form of the footless grub, furnishes the highly cherished gru-gru worm of the native Indians, the prepared dish of which is said, by those who have partaken of it, to far exceed the delicacy of marrow-bones.

The ravages of the larval stages of insects, and more

particularly of caterpillars of Lepidoptera, are very familiar sights on nearly all varieties of plants. Thus the caterpillars of *Pachylia ficus* are well-known in relation to the destruction of fig trees; of *Caligo oregon* in the case of bananas and plantains; of *Pseudosphinx tetrio* with the frangipani; of *Dilothonota ello* in the case of the cassava; of *Philampelus linnei* on the vine; of *Argeus labrusca* on the passion-flower and oleander; of *Protoparce carolina* on the tobacco and Irish potato; of *Megalopyge tharops* in the case of the mango, orange etc., and of *Attacus hesperus* in the case of the orange, lime, courida and Duranta etc.

Quite recently, moreover, the various cabbage palms (*Oreodoxa*) about the town, and not a few of the cocoanuts and other palms, have been more or less stripped of their leaves owing to the ravages of some rather small lepidopterous larvæ, which, after stripping the tree so as to leave the bare midribs and lateral fibro-vascular bundles more or less naked, make distinct compound nests by the union or lacing together of parts of other leaves, in which chrysalids are placed.

Through the kindness of Mr. JENMAN, Superintendent of the Botanic Gardens, some dozens of these caterpillars, taken from palms under his care which had been attacked, were sent me to the Museum, and, within a few days, had settled down as chrysalids on the under sides of the palm fronds which had been sent with them. Now, some nine days after, more than two dozen imagoes have hatched out, shewing the common yellow-barred brown butterfly, *Brassolis sophoræ*, which in my own experience hitherto had only been known as attacking the various forms of lilies, and especially species of *Hippeastrum*.

Unique Stone Adze.—A few days ago, one of the most remarkable of the Stone Implements hitherto found in British Guiana, was presented to the Museum by Mr. J. W. Johnson. The specimen was obtained, at some few feet depth, in the Sand Hills of the Demerara river, during the removal of sand. It consists of a smooth, elongated and curved adze, about 15 inches in length, composed of a very fine-grained and hard greenstone (*diorite*). The one extremity is fashioned to represent the head of an animal, with elongated face, rather blunt snout, and retreating and flattened under jaw, the division of the lips and the outline of the mouth being well-marked. The ears are well represented by raised rounded and apically indented projections, at about 3 inches from the extremity; and along the upper edge, the back is shown by means of a distinct ridge or slightly marked keel. The under side is rounded as in the belly of an animal. No legs are indicated, but the other extremity terminates in a broad but vertically compressed wedge-shaped edge, which evidently was the cutting or digging edge of the implement. The whole form of the adze is most strongly suggestive of the shape of one of the commonest of the Guiana animals, the accourie or aguti (*Dasyprocta aguti*), which, more especially as seen in its dead and stiffened condition, or as stretched to its utmost limits as during rapid flight, was almost certainly in the mind of the maker of the implement:

Two of the most noteworthy features of the adze still, however, call for notice. About two inches behind the representation of the ears, a broad abraded band (about an inch in width) girdles the body, indicating the position of an original handle, presumably of the type of the

split or bifurcated pieces of wood, such as are well-known from other localities of primitive races, as well as of the binding bands which give strength and rigidity to the weapon. The second point consists of a partial abrasion of the stone between this band and the ears, on the back—an abrasion of about $1\frac{1}{2}$ inch in width and of a circular girth of the stone less than one half of the circumference. This seems to point conclusively to the fact of a back piece having been present, bound to the open bifurcations of the handle and serving to resist the tendency of the adze-head to fly away from its setting during use. From the extent and degree of these abrasions, the weapon had evidently seen a considerable amount of service, while from its great size and weight, it must have been a weapon of no mean effectiveness and strength.

Little by little, our knowledge of the prehistoric implements to be found in Guiana is being extended, giving promise at no very distant date of the possibility of a history of these remains, and one replete with interest. To such a history, the present implement affords a distinct and remarkable chapter, as remarkable, though of a perfectly different kind, as an arrow-head of rock crystal, of the roughly flaked palæolithic type, recently found in one of the placer gold mines of the Puruni river, and now in the large and unique set of Guiana Stone Implements in the collection of Mr. Everard F. im Thurn, the Government Agent in the N. W. District of the colony, whose contributions to the history of the Guiana and West Indian Stone Implements, the earlier issues of this Journal abundantly illustrate.

IN MEMORIAM.

William Walker: Formerly Lieutenant-Governor of
British Guiana.

(See the Minutes of the January Meeting of the Society.)

Report of the Meetings of the Society,

' Meeting held on the 15th January.—Hon. B. Howell Jones, President, in the chair.

There were 15 members present.

Elections.—*Member:* Mr. J. F. Flagg.

Associates: Messrs. A. Waby, W. J. Veecock, E. Swan, N. C. H. King, W. H. Welsh, J. H. Humphrey, J. Johnston, W. O. Wilson, and D. Fraser.

The President said that before proceeding with the business of the meeting, he thought he would be right to express the great regret of the Society at the death of Mr. William Walker, who had been their Resident Director in London for many years. He had been connected with the colony and the Society for a long time, and had always taken the greatest interest in both. Mr. Walker was Government Secretary and Lieutenant-Governor, and administered the Government of the colony on four different occasions. He joined the Society in 1848, being on the Directorate in 1852, when he assisted the Society in getting its first Act of Incorporation passed. In 1855 he was Chairman of the "Executive Committee of the Exhibitions and Museum Fund" of the Society, which was embodied for the purpose of establishing a Museum and collecting specimens for the Paris Exhibition of 1855. That Committee projected a magazine, to be called "The British Guiana Journal," but he (the Chairman) had been unable to find out whether it was ever published. He was President of the Society in 1855-6, and was on the first Committee

of Correspondence in the latter year, being Chairman of the same Committee in 1859. He was elected an Honorary Member in 1857 and Vice-Patron in 1861, and in the same year he joined with some other gentlemen to establish a local Natural History Society. He contributed towards the erection of the present building in 1864, and, retiring from the Colonial service in 1866, was elected Resident Director in London. They all knew something of his services in late years, and it was right that the Society should place upon its minutes an expression of regret for his loss.

The Treasurer laid over the statement for 1890, shewing the balance at credit of the Society on Decr. 31st, a list of members of good standing &c.

On the suggestion of the President, the accounts were referred to two of the Directors, Messrs. B. S. Bayley and F. A. R. Winter, to be audited, after which they were ordered to be posted in the Reading Room, and brought up at the next meeting for final adoption.

TIMEHRI.

Cost of Printing and Publishing Part 2 Vol. 3		\$	258	31
" " " " 1 " 4			246	11
			<hr/>	
			504	42
Less sales by Part 2 Vol. 3 and 15 Back Nos.	120	10		
" " 1 " 4	127	88	247	98
			<hr/>	
			256	44
Less sales by J. Thomson, \$10 08; Stanford				
\$20 94			31	02
			<hr/>	
			225	42
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The Royal Agricultural and Commercial Society of British Guiana.—Receipts and Expenditure for the Year 1890.

RECEIPTS.		EXPENDITURE.	
To Society's Funds, 31st Dec. 1889	\$ 1,038 07	By Salaries	\$ 2,502 00
" Subscriptions—		" Periodicals and Magazines,	
" Ordinary Members...	...\$ 1,792 00	497 49	
" Country Members ...	... 438 00	" Less Newspapers etc., sold,	
" Associates...	... 951 25	36 46	... 461 03
" Lady Subscribers ...	... 63 75	" New Books added to Library	567 14
		" Advertising Stationery and	
		Subscription to Local News-	
		papers	283 15
" Arrear Subscriptions	... 3,245 00	" Binding	121 72
" Rents ... ..	... 2,552 00	" Repairs to Buildings	213 91
" Catalogues ... ..	... 43 68	" Cost of New Furniture and	
" Interest 46 62 Profit from		hire of Chairs	38 34
" Hand-in-Hand \$163 05 ...		" Cost of Timebri to 30th June	
" Scrip from Hand-in-Hand	372 72	\$256 44 less Sales 31 02 ...	225 42
\$163 05		[Cost of Printing and Publish-	
		ing less sales by Publishers	
" Received from the following	6,251 65	256 44; Less sales of back	
towards new fittings for		number, Publisher \$10 08;	
Museum:— Balance from last		Stanford \$20 04—31 02]	
year	839 50	Insurance with Hand in Hand	
George Garnett	40 00	Insurance Coy. Buildings	875 00
		and Contents \$50,000 at 1/4...	
		" Postages Petty and Reading	163 33
		Room Expenses	
		Paid Mr. Rodway for experi-	
		ments with dried Bananas	50 00
			5,501 04
		Paid towards new cases for	
		Museum...	161 98
		At Cr. A/c for Museum pur-	
		poses	717 52
			879 50
		Society's Fund per Balance	
		sheet	\$ 6,380 54
			1,788 68
			\$ 8,169 22
			\$ 8,169 22

TIMEBRI.

The Assistant Secretary read the following letter from the Committee of Correspondence :—

The Museum,

January 8th, 1891.

R. T. A. Daly, Esq.,

Hon. Secty. R. A. & C. Society.

Sir,—I have the honour to state that at a meeting of the Committee of Correspondence held on Tuesday the 6th instant, Mr. G. H. Hawtayne, C.M.G. and Mr. Turner were elected Chairman and Vice-Chairman, respectively.

At the same meeting the letters from the Government Secretary and from the Colonial Secretary, Natal, with regards to statistics relating to any Inter-colonial Exhibition held in the Colony, were also considered ; and I was instructed to write to the Government Secretary forwarding a report on the details of the Inter-colonial Exhibition 1885, on the various points enumerated by the Natal Government—which has been done. Copy of the report herewith attached.

By a resolution of the Committee, the Hon. Treasurer was directed to hand over to the Hon. Secretary of the Berbice Exhibition Committee, for the purposes of the Industrial Exhibition 1891, the sum of \$8:4 89, the balance left over from the vote towards an Exhibition at Buxton.

The Committee would also urge upon the Society, the desirability of providing a suitable working-room attached to the Museum, instead of the present old building which is unfit for the purpose.

I have the honour to be,

Sir,

Your obedient servant,

J. J. QUELCH,

Hon. Secty. Committee of Correspondence.

**DETAILS OF THE COLONIAL EXHIBITION 1885, ON THE VARIOUS POINTS
ENUMERATED BY THE COLONIAL SECRETARY, NATAL.**

(A.) *Guarantee, if any, Etc.*—There was no Guarantee Fund.

(B.) *Assistance of Government.*—The funds for the Exhibition were furnished by the Government in yearly votes of \$2,000 during the years 1883-1885.

(C.) *Contributions of the Public.*—There was no contribution of funds from the public. Exhibits were well represented and bore

Exhibitor's estimate of price for sale. If not sold, exhibits were returned to the Exhibitors.

(D.) *Composition of the Managing Body.*—The Managing Body was formed by a Committee of Members of the Royal Agricultural and Commercial Society of British Guiana, assisted by Local Secretaries.

(E.) *Details of Expenditure.*—The cost of the Exhibition amounted to close upon \$7,000, the chief items being (1) Labour, (2) Materials for Sheds, etc., (3) Advertising, (4) Prizes.

(F.) *Necessary Building, Cost of Etc.*—Large permanent public places, such as the Assembly Rooms, the New Market etc., were made use of, together with temporary sheds erected for stock—the timber of the sheds being afterwards sold at auction,

(G.) *Sources of Revenue.*—Gate-Money. The Exhibition remained open for four days. Entrance fee on the 1st day 4/, on 2nd day 2/, on 3rd and 4th days 1/. Children half-price. Schools and teachers free.

(H.) *Financial Results.*—Satisfactory. The expenses of the Exhibition being defrayed by the \$6,000 received from the Government, and the gate-money which amounted to about \$700.

(I.) *Attraction of Foreign Exhibits.*—Exhibits were received from Trinidad, Tobago, St. Lucia, St. Vincent, Dominica and Surinam,

(J.) *Commercial and General Results.*—An encouragement of local industries.

(K.) *All accessible Printed Documents.*—Prize list, with the address of the Committee, attached.

In the matter of a working room for the Curator of the Museum, the President said that it was desirable that a suitable building should be erected, as at present, when any large specimen is to be dissected, there are many difficulties. The Society could not afford to build a suitable place, unless they called for special subscriptions, and as the Museum was now a public institution, visited daily by both rich and poor, he thought he might ask the Government for aid.

The Assistant Secretary reported the election of the following Office-bearers:—

Agricultural Committee: Chairman, Hon. B. Howell

Jones; Vice-Chairman, A. Braud; Secretary, James Gillespie.

Commercial Committee: Chairman, W. H. Sherlock, Vice-Chairman, J. J. Dare; Secretary, Ferris Grant.

In the matter of the "Mail Passenger List" which had been brought up at the previous meeting, the Assistant Secretary reported that a letter had been written to Messrs. Garnett & Co., asking that a list should be supplied to the Society. In reply, an answer had been received saying that "as so many lists have to be supplied at this port, your request cannot be granted;" if however, someone was sent to the office on the arrival of the Mail, he would be allowed to make a copy. Accordingly, on the arrival of last Mail, a copy was made by one of the library attendants.

Messrs. Mackay and Bayley spoke of the ungracious answer of the Mail Company, the latter proposing to make a motion that the Directors take steps in the matter, when Mr. F. W. Collier offered to supply the copy of the list which was sent to the Post Office with the Mails. This offer being accepted, with thanks, the matter was allowed to drop.

Mr. Hawtayne suggested that the meeting be held in another part of the Reading Room, as he could scarcely hear what was said, on which the Chairman said they would try another place next time, and if that was not satisfactory, hold the meeting in the Exchange Room.

Mr. Quelch laid on the table a stamp album which had been lately presented by Mr. Collier to the Museum. They had to thank Mr. Collier and the Government for the stamps, and he hoped that the collection would be increased by further contributions from time to time.

The Chairman thought that such a collection should be kept in the hands of the Curator, as it might be tampered with if open to everybody.

The meeting then terminated.

Meeting held on the 12th February.—Hon. B. Howell Jones, President, in the chair.

There were 14 members present.

Elections.—*Member* : D. Ouckama.

Associates : G. E. Turpin, Henry Fernandes, and James G. Dewar.

The Report of the Treasurer, which had been laid over from the previous meeting, to be audited, was, on the motion of the President, seconded by Mr. Conrad, adopted.

Mr. Quelch, the Curator of the Museum, read his report on the institution for 1890 (annexed).

REPORT ON THE MUSEUM—1890.

To the Directors : The Royal Agricultural and Commercial Society. Gentlemen,—I have the honour to lay before you the following report on the arrangement and working of the Museum during the past year.

(A.) *Arrangement.*—At the close of the year 1889, it became possible through the funds collected by the energy and interest of Mr. G. H. Hawtayne, C.M.G. while President of the Society, to carry out the long deferred rearrangement of the cases and exhibits ; and to supplement the cases with others that had for a long time been needed. The high glass-cases were arranged centrally, and were devoted to the Exhibition of specimens of the Fauna of the Colony. They were restained without and repainted within, and the arrangement of the shelves remodelled for the better exhibition of the specimens.

The series of table cases were arranged on each side of, and between these tall cases, and were devoted to specimens of Birds, Mollusca, Insects, Minerals and miscellaneous objects.

A series of 18 new wall cases, with plate-glass doors in one piece—the first case the gift of Mr. George Garnett, and the others paid for from the funds collected by Mr. Hawtayne—had meantime been placed along the sides of the building, thus utilising the waste spaces between the windows ; and these were arranged with specimens of Osteology, Mollusca, Sponges, Corals, Foreign and Colonial Ethnological Collections, Fibres, Fruits, Seeds, Gums, Barks, and other economic products and miscellaneous objects, which had formerly been shown either in the tall glass cases, or in miscellaneous cases on large old tables which took up a considerable portion of the floor space, and by no means improved the general appearance of the Museum.

A series of large new cabinet cases, paid for out of the same funds, were also placed along the sides by the entrance, replacing the open shelves that formerly occupied the space ; and in these cases a reserve collection of specimens—chiefly the beginning of a type series of the Fauna of Guiana, and duplicate sets—has been arranged.

Other cabinet cases for this purpose, and for storage of specimens generally, which are not intended for immediate exhibition, together with special table cases for the exhibition of Mollusca, Insects, Birds'-eggs, Minerals, Coins, etc., are being arranged for, and will be constructed so as to fit in with the time of arrangement of the specimens—these cases also to be paid for out of the funds collected by Mr. Hawtayne.

(B.) *Acquisitions*.—During the past year, a considerable number of additions has been made to the Museum Collections among the various classes of objects, though chiefly to the groups of the Fauna.

Among the donors, the following are chiefly worthy of mention :—

Mr. John Junor, Mr. G. S. Jenman, Mr. R. C. Curtis, Mr. F. W. Collier, Mr. C. A. Lloyd, Mr. E. F. im Thurn, Mr. G. H. Hawtayne, C.M.G., Mr. H. I. Perkins, Mr. G. F. Franks (Barbados), Messrs. Carter (Barbados), Mrs. J. B. Harrison, Mr. D. Spence, Mr. R. Spence, Capt. Arnot, Mr. A. Parrett, Mr. George Garnett, Mr. W. Humphreys, Mr. Felix Smith, Mr. J. Waby, Mr. A. Waby, Mr. B. Ross, Mr. J. M. Moore, Revd. W. J. West, Dr. Law, Dr. Matthey, and Mr. J. F. A. Rawlinson.

(C.) *Conservation*.—A large number of specimens, comprising some of the largest animals of the Colony, which were mounted in England, has been added to the exhibited series. Besides these, specimens of the different groups acquired by presentation and purchase have been preserved, and in many cases rendered fit for exhibition.

A very considerable number of the exhibits have been relabelled, and, in many cases, explanatory labels have been made use of. The renewal of labels and the cleaning of specimens, owing to the badly-fitted doors of the large old cases, are matters of constant occupation, in order to keep the exhibits in decent preservation.

The identification of specimens has been continued, but extreme difficulty is encountered in this department, owing to the want of a special systematic science literature.

(D.) *Exchanges*.—Exchange specimens have been received from the British Museum, London, and from the United States National Museum. Various offers have been received from various foreign Museums and dealers, but after our request for the first instalment of specimens to be made by them, to shew the bona fides of the transaction, nothing more has transpired.

(E.) *Travelling*.—Two chief collecting expeditions have been made, along the Upper Demerara, and the Upper Berbice rivers, on each of which a large number of desirable specimens were obtained and preserved. Shorter trips have been made to the Canje Creek, the Lower Demerara, the Mahaica and Mahaicony Creeks. Of the longer expeditions, reports have been written, and have been, or are being, published in the Journal of the Society.

(F.) *Miscellaneous*.—The time of the Curator has also been occupied with a correspondence—by no means inconsiderable—both foreign and colonial, touching the business of the Institution; with the business of the Committee of correspondence; and with the editing and writing for the Journal of the Society.

Before closing this report, the Curator wishes to again bring before the notice of the Directors, that no adequate provision has been yet made for a working-room attached to the Museum. The old building which has hitherto done duty for this purpose, and as a storehouse for articles of all sorts, is quite unsuited for the purpose, and not only considerably hampers the work, but often renders of no avail, work which has taken a considerable amount of time, care and expense for its performance.

Some change in this respect is most urgently needed, either by a thorough repair of the old building, which is not to be recommended, or by the construction of a suitable place on the same site. A drying yard or space, with good sun exposure, a concreted basement with good shelter and water supply for taxidermic operations, with gas laid

on, and suitable rooms for work and storage, where specimens can be protected against destructive animal life, dust and moisture, are real desiderata; and but a slight amount of reflection will show that the want of these essentials is not only prejudicial to, but is even destructive of, the interests of such an Institution.

I have the honour to be,

Gentlemen,

Your obedient servant,

J. J. QUELCH,

Curator.

The President said they had to thank Mr. Quelch for the Report, which showed that good work was being done in the Museum. The lack of accommodation had been receiving the attention of the Directors during the past month, but there were difficulties in regard to the site as well as the expense. He hoped however that something might be done in the course of the year.

The Treasurer said that the funds of the Society would not admit of its doing anything, it would therefore be necessary to apply to the Government. The annual grant was hardly sufficient to pay the Curator's salary and the working expenses.

Mr. Hawtayne said that plans for an extension of the Museum, were drawn up some time ago, but owing to the deficiency of funds, the Government told them to come again. He thought the Curator should have every facility for carrying on his work, and it was hardly fair to expect him to undertake the preparation of specimens without conveniences. The Museum might have some new features added if it was enlarged, such as Technical specimens to instruct the people. He proposed that the President should appoint a Committee to go over the old plans, with a view to approach the Government for an additional grant.

The President said that he believed the cost of carrying out the plans was estimated at \$12,000. It would be too late to apply for such a sum during the present session of the Court. He thought that a lesser sum, say \$2,000, might be obtained if it was applied for at once. With this sum, a commencement might be made by fixing up the house near the Muscum, so that the Curator might carry on his work.

Mr. Hawtayne thought that any improvements should be carried out as part of the larger plan. Mr. Winter was also in favour of a fixed plan being gradually accomplished

It was then moved by Mr. Hawtayne and seconded by Mr. Turner, that the President appoint a Committee to devise a plan for carrying out such improvements of the Museum as may be necessary to meet the requirements of the Curator.

This having been carried, the President nominated Messrs. G. H. Hawtayne, W. S. Turner, P. Cressall, F. A. Conyers and Luke M. Hill, as members of the Committee.

The Secretary reported that the Government had applied to the Society for information in regard to agricultural statistics &c., for the Blue Book of 1890, in answer to which the Agricultural Committee had drawn up certain information (annexed.)

REPORT OF AGRICULTURAL COMMITTEE.

Average rate of wages for labour can be left the same as last year. with the exception of Masons and Carpenters, and the foot note should read as follows —!

"The rates of prædial labour have ruled high throughout the year, and were generally in excess of those quoted above, in consequence of the exodus of able-bodied labourers to the gold-fields, which industry has greatly increased. Balatta gathering has also attracted a larger

number of hands who were formerly employed on estates, especially in Berbice."

Manufacture of Sugar.—Improvements during 1890 have been made on an extensive scale, chiefly in the direction of economising fuel, and the extension of the system of burning green megass direct from the mills and the results have warranted the expenditure, both as regards the consumption of coal and economising of labour.

The diffusion process has made steady advances during the year ; the large plant at Pln. *Belair* has been completed, and an additional battery erected at Pln. *Nonpareil*, and more powerful evaporating machinery in connection with diffusion has been put up at Pln. *Reliance*.

Large evaporating plants have been erected at Plns. *Bellevue*, *Henrietta* and *Houston*, and a large distillery with continuous still, added to the plant at Pln. *Diamond*.

The sugar crop was considerably under 1889, due to the continuous wet weather that prevailed from November 1889 to July 1890, which especially affected the stiff clay lands on the East and West Bank Demerara River, West Coast, Essequibo Islands, and more or less, the whole counties of Demerara and Essequibo. In Berbice the rainfall was not so heavy, and the crops were up to the average. The abnormal wet season also seriously affected the small farmers, and acres upon acres of land under plantains, and ground provisions were drowned out, and in consequence, plantains and ground provisions rose considerably in value at the end of the year.

Minor agricultural industries do not seem to have made much progress during the year ; the weather, no doubt, was much against any progress.

B. HOWELL JONES,
Chairman.

Mr. Conrad proposed that the Reading Room should be provided with a Telephone, which he thought would be a very great convenience to members. The President said he believed there were no Telephones to be had at present, to which Mr. Conrad replied, that there might be a chance of getting one. It was finally decided that the proposition should be considered as a notice of motion, to be brought up at the next meeting.

The thanks of the Society were accorded to the Revd. W. B. Ritchie, for a copy of the Year Book of the Church of Scotland for 1891.

Mr. Quelch, as Secretary of the Committee of Correspondence, reported having received a letter from Dr. Rowland, Secretary of the Berbice Exhibition, in which he intimated that he intended to forward a report of that exhibition to the Society. Dr. Rowland also mentioned the intention of the Committee to ask the Government for an annual grant of \$500 for periodical shows of a similar character to that of Berbice.

The President said he had visited the Exhibition and considered it a very creditable one, but he was sorry to say that hardly any of these exhibitions held in this colony were of much practical value. They wanted, as Mr. Hawtayne had suggested, a Technical Museum, where people might learn how to prepare things for the best markets. The people of this colony ought to be able to manufacture their articles so that they could compete with others.

Mr. Hawtayne said he was glad to be able to inform the meeting that the lectures, which had lately been suspended, would be again started. Mr. Vyle had kindly promised to lecture on Electricity in the present month, Mr. Sherington would follow in March, after which he had promises from Mr. Quelch, Sir Charles Bruce and the Hon. Dr. Carrington.

The meeting then terminated.

Meeting held on the 12th March.—Hon. B. Howell Jones, President, in the chair.

There were 15 members present.

Elections.—*Members*: Messrs. Wm. Marr, Chas. F. Bethune, John Bee, Arthur J. Sweetnam and Lieut. A. Moon.

Associates: Messrs. J. A. P. Bowhill, M. P. Jorge, Jnr. and F. O. Franker.

The President informed the Meeting that the Committee appointed to devise a plan for carrying out the necessary improvements to the Museum, had met on the day after their appointment and addressed a letter to the Government, asking for a grant of \$2,000. In reply they had received an answer stating that "as the revenue for the coming financial year will be charged with some exceptional special expenditure of large amount, His Excellency regrets that he is unable to accede to the application." The President promised that the matter should be brought up again in time for the next Combined Court.

Mr. Jacob Conrad's motion, that a Telephone be provided for the use of members of the Society, was then brought forward, and, in the absence of the mover, allowed to stand over, but shortly afterwards on Mr. Conrad's arrival, it was taken up again.

Mr. Conrad said that a Telephone for the Reading Rooms was a great necessity, as business men could communicate with their offices without having to go away, and so be able to come up to the Reading Room for half an hour or so knowing that they would be called if required. Mr. Hawtayne seconded, and Mr. Davis supported the motion, which, after some discussion, was carried, eight voting for and six against.

The Revd. W. B. Ritchie asked if it was not possible to open the Reading Rooms at night. He was sure

that a great number of young men, who had not time to come in the day, would feel it as a boon if the Rooms were open for two hours in the evening, say from 7.30 to 9.30.

The President said that this had been tried on three different occasions and on each of these it had failed for want of support. The average attendance was three on ordinary evenings, and a few more on those after the arrival of the Mail. Mr. Bayley attributed the poor attendance to bad lighting, while Mr. Vyle suggested that chess and draughts might prove attractive. Mr. Hawtayne did not think they ought to incur the expense of lighting, and give extra trouble to the Librarian and his Assistants, if only one or two came to the rooms. It was finally decided that Mr. Ritchie should give a notice of motion, so that the matter might be discussed at the next meeting, meanwhile the Assistant Secretary was directed to obtain the views of the members by putting up a notice in the Rooms.

The Revd. Mr. Ritchie then read his motion as follows:—"At next meeting, I shall move that the Reading Rooms be opened for two hours every evening, (Lecture evenings excepted) the hours to be fixed as the Society may think most convenient."

Mr. Æneas D. Mackay suggested the desirability of opening the Museum on Sunday afternoons from two to four o'clock. He understood that the Curator and his Assistants were desirous that this should be done, and were quite willing to do their part.

The President thought this was a matter for a motion and that the members would probably like to have their say, he therefore suggested that Mr. Mackay give formal

notice so that it might be discussed at the next meeting.

Mr. Mackay afterwards handed in the following notice of motion:—

“ That in view of the educational value of a Museum, the Curator be empowered to open the Society's Museum from 3 to 5 p.m. on Sunday afternoons, for the benefit of those who might find it more convenient to visit the institution at such a time, than on the ordinary working days.”

The meeting then terminated.

Meeting held on the 9th April.—Hon. B. Howell Jones, President, in the chair.

There were 23 members present.

Elections.—*Members*: Messrs. D. Ritchie, J. M. Carrick and W. Blair.

Associates: Messrs. P. E. Wainwright, Wm. Craig, F. Darrell, and D. T. Straghn.

The President mentioned that Mr. N. Darnell Davis had been elected Secretary by the Board of Directors, Mr. Daly having resigned the office. He felt quite sure that the Society could not have secured any one who would devote himself more to the benefit of the Society than Mr. Davis, and he thought they might congratulate themselves on his having accepted the appointment.

The Revd. W. B. Ritchie brought forward his motion, of which due notice had been given, that the Reading Rooms be opened for two hours every evening.

In seconding the motion, Mr. Watt said that he did not consider that the former experiments in opening at night, had been fair trials. There were several draw-

backs, firstly the place was not properly lighted, secondly, no books were issued, and finally papers were allowed to be taken away at six o'clock, under Rule 15. With such drawbacks it was only natural that the opening was not successful in attracting readers.

Several members spoke in favour of the motion, Major Walthall mentioning the additional labour to the Librarian and his Assistants, and Dr. Carrington the cost of lighting. Mr. Daly said that no complaints were made of the lighting when the former experiment was made. The President said he would like to encourage the young men to come and read in the evening, if there was the least prospect of success.

Mr. Vyle moved as an amendment, that the Exchange Room be opened from 7 to 9:30 p.m., and provided with newspapers, chess and draughts, and that smoking be allowed. This having been seconded by Mr. Walter Smith, it was supported by several speakers on the ground that it would be less costly to light and more comfortable.

Major Walthall proposed as a further amendment that the whole matter be referred to a Committee, who might report to the next meeting. This having been seconded by Mr. F. W. Collier was put to the vote and carried by 11 against 5.

The President then nominated the following gentlemen to form the Committee:—

Revd W. B. Ritchie, Convener, Major Walthall, and Messrs. VYLE, F. W. COLLIER and WALTER SMITH.

In the absence of Mr. MACKAY, his motion that the Museum be opened on Sunday afternoons was left over until next Meeting.

Mr. JACOB CONRAD gave notice of motion as follows :—

“ At the next meeting I shall move that the Society, recognising the necessity for the interest of the colony to establish a school or college of Agriculture.”

“ Be it resolved that this Society shall appoint a Committee to petition, without delay, the Governor and Court of Policy, to establish and maintain an Agricultural school or college.”

The President mentioned that the next lecture of the series would be given by Sir CHARLES BRUCE on the 23rd instant.

Mr. N. DARNELL DAVIS stated that in conversation with Mr. KROGH, the Venezuelan Consul, on the means of developing a trade between this colony and Venezuela, he had asked him to attend the present meeting and give his views on the matter. As however Mr. KROGH was unable to attend on account of being unwell, he had sent a letter. This was read, and referred to the Commercial Committee for report.

Mr. QUELCH, Secretary of the Committee of Correspondence, laid over the Report of the Committee of the Berbice Industrial Exhibition (printed on page 34), from which extracts were read, in which they stated that they thought it advisable to have another show in August or September, 1892, if the Society would continue to support them with finances as had been done on the late occasion.

The President, referring to the balance of \$445 97, said he thought it advisable that it should be retained, as the Society would probably have to hold an Exhibition towards the end of 1892, in anticipation of the World's Fair in Chicago ; such being the case he did not think they could promise to assist their friends in Berbice next year, but must rather ask them for aid.

In answer to a question of the President, Capt. White said that he could give little information in regard to the Banana Industry beyond that contained in Captain Baker's report to the Government. Dunoon had been lately sold, and its new owners agreed to put five hundred acres in Banana cultivation. This and other promises would make 2,200 acres, so that only 800 acres more were wanting to make up the amount asked for by the Boston Fruit Company. The plants brought here from Jamaica were doing very well so that there was every reason to suppose that the industry would be a success if fairly started.

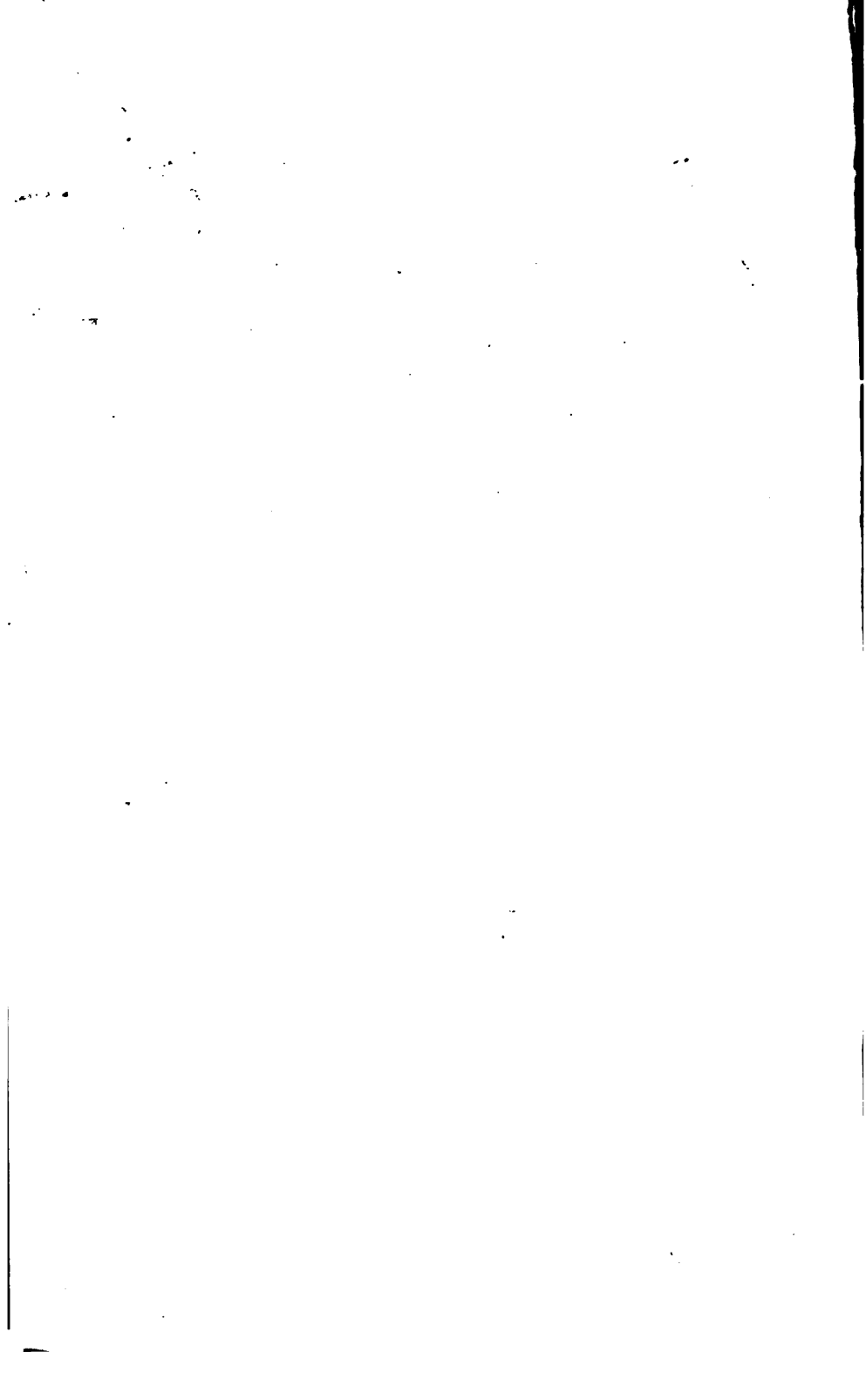
Major Walthall moved that a vote of thanks be accorded to the late Honorary Secretary, Mr. Thomas Daly, for his efficiency, punctuality, patience, courtesy and good humour, during the period he had held the office. This having been seconded by Mr. Conrad was carried unanimously.

The meeting then terminated.

ERRATUM.

On page 3, line 30, for *dessication* read *desiccation*.





The Constitution of British Guiana.

By James Rodway, F.L.S.

IN view of the recent changes in the constitution of this colony, it has been thought desirable to give a short sketch of the origin and growth of the unique institutions which have formed the laws and governed the people so ably during almost two centuries. Like the constitutions of the Mother Countries, Holland and Great Britain, it has grown from very small beginnings, but unlike those, this may be fairly traced to its fountain head. However we may stigmatise it at the present day, as antiquated and out of date, history proves that it was considered of the utmost importance in past times, and a firm bulwark against the arbitrary rule of the West India Company as well as the British Government. The colonists stood firm against its infringement on several occasions, going so far as to refuse paying taxes as long as their rights were not respected, and compelling the home authorities to give way to their demands.

Before the year 1698, there was no Council or other legislative body, any *Placaats* or Ordinances being issued on the sole authority of the Commandeur, who governed the Company's servants in accordance with the "Articled Letter," which every one had sworn to observe on entering the service. There being very few settlers, and these not coming under the immediate jurisdiction of the only authority in the colony of Essequibo, they were left pretty much to themselves. It

may be presumed that after they obtained their grants of land—which were not even surveyed—the Commandeur only interfered now and then, as in 1686, when ABRAHAM BEEKMAN ordered that no Indian slaves were to be bought without his knowledge and consent. Some disputes among the few planters however, induced that Commandeur to suggest to the Company that a Court of Justice should be established.

Under the next Commandeur SAMUEL BEEKMAN, in 1698, a *Raad van Politie* was established, composed of the Commandeur, Secretary and the four Managers of the Company's plantations, who met once a quarter to transact business connected with the fort, trade and plantations of the Company only. Except in regard to the granting of land, this Council had nothing to do with the private planters, their meetings being held simply to discuss the Company's business, the state of the crops, the reports to the Directors, and the work for the coming quarter. In the same year the Directors resolved to impose a head-tax of one dollar on each slave belonging to the private settlers, as well as a land-tax of a stiver per acre. The first being confirmed by the States General, was imposed annually up to the time of the emancipation under the name of the Company's or King's taxes, but for some reason or other the acreage tax was not collected, while afterwards when the Commandeur was ordered to enforce it, the planters absolutely refused to pay.

Thus taxation was imposed, but as yet no one thought of anything like a legislative body. The number of free settlers was about thirty, and their slaves would amount to something like eight or nine hundred, while the expenses of the colony were \$348 80 a month, besides

the cost of rations. It may be seen from these figures that the contributions of a dollar a head, went but a little way towards paying expenses, which were provided for by the profits on Indian trading and the produce of the Company's plantations.

In 1718 the constitution of the Council was altered and it became a *Raad van Politie en Justitie*, its members being the Commandeur, Secretary, and two Managers. The same Councillors sat in both capacities, either as a business meeting or a Court of Justice. Soon afterwards the private planters began to feel that the time had come for them to have a voice in the Government, and in 1739, under the enlightened administration of Commandeur GELSKERKE and his able Secretary GRAVES-ANDE, the first representative Councillor was elected to the Council of Justice. The seat of Government was then at the Huis Naby, Cartabo, but preparations had already begun to move nearer the mouth of the river to Fort Island. At the meeting of the Council of Justice, held January 2nd 1739, there being present, besides the Commandeur and Secretary, CORNELIS BOTER and JACOBUS VAN RODEN, a communication from the Directors was read, consenting to a proposition that the number of Councillors should be increased to six, one of the two additional members to be a free planter. GELSKERKE then, on the part of the Company, chose JOHAN HENDRICK MUNCX as the new official, and on the request of the other Councillors, nominated two free planters from whom they chose ABRAHAM PHILIPUS HERAUT, who thus became the first representative of the colonists.

This may be considered a very small concession, as it undoubtedly was, but it was something that the barriers

of officialdom were now broken down, and that even one voice could be raised in defence of the colonists. As may be seen, there was no election, no College of Kiesheers, but the whole thing was done in the Council itself. Nevertheless, judging from the Dutch political system, it may be confidently affirmed that the colonists had already been consulted, and that their wishes were respected.

The doings of the Council of Justice, it might be supposed, could hardly be referred to as precedents for matters connected with a legislative assembly, but such was the constitution of this body, that it was something vastly different from a civil or criminal court. The Court of Policy was simply an Executive Council, while that of Justice was empowered to pass Ordinances and even take measures for the protection of the colony, as may be proved by the following cases.

In 1737 there were rumours of a probable war with France, and as the colony was not in a fit state to defend itself, the Councillors were asked what should be done. They first wanted to know what measures the Company would take, and agreed that every one should pay for the defence of his property according to his means. It was finally resolved, that in case of war an extra head-tax of four guilders should be imposed on all slaves, to continue only so long as the war lasted. The Councillors could not vouch for the payment of the tax by certain owners of plantations who lived at Middelburg, *because they had not been consulted.*

In 1747, rumours of an invasion from Spanish Guiana, caused a great deal of alarm in Essequibo, and on 7th of October, Commandeur GRAVESANDE proposed to

the Councillors of Justice that an extraordinary head-tax of one rix dollar should be imposed to procure fifty additional soldiers. The members however would not take the responsibility of doing this, but resolved *to call up the Burgher Companies and submit the matter to them*, leaving them to decide whether they would pay the tax or undertake the extra duty themselves.

The above cases are very important, shewing as they do that the settlers were consulted before any matter affecting their interests was decided, and also, that any tax beyond the customary dollar a head to the Company could only be imposed with their consent. On these and other decisions of the early Councils, depend the rights of our Financial Representatives to have a voice in the imposition of taxes and the expenditure of the colony.

The Burgher system appears to have been in existence from the arrival of the first settlers, being a modification of that of the Mother Country, but it was not until Essequibo was opened to all nations, in 1740, that some sort of order was introduced. With the remove to Fort Island in the same year, Essequibo was divided into two districts, the upper in the vicinity of Kyk-over-al, and the lower near Fort Zeelandia. Every new settler, whatever his nationality, was required to take the oath of allegiance, on which he was entitled to the rights and privileges of a citizen, and was enrolled as one of the Burgher Militia. The Companies of each district were commanded by a Captain, Lieutenant and Ensign, these officers performing the duties of justices of the peace and even constables, as well as being the medium of communication between the settlers and the government.

At first, they appear to have been elected by the Burghers, but afterward, by the Commandeur and Council. The six Burgher Officers met together occasionally, forming a Court Martial for the trial of offences and to discuss matters of importance.

Here was the germ of a representative government of a certain type—a body of men combined to preserve order, with elective officers ready to consult them when necessary, and whom they could trust. In some of the Dutch towns a custom had arisen of the Burghers choosing a few of their number to elect their representatives, these nominating two persons for a vacant place in the Council going under the name of Kiesheers (electors). Having this in view, no doubt with the consent of the Burghers, Commandeur GRAVESANDE, in 1743, constituted the Burgher Officers, or College of Kiesheers for the purpose of nominating two persons for a vacant place in the Council of Justice when necessary. Their first nomination was made in the same year, when the Council was increased to seven members by the addition of ABRAHAM VAN DER CRUYSSSE, two of these being now representatives of the private settlers.

In Berbice, the Charter of 1732, settled the constitution of that colony once for all, so that little development was possible. Under the feudal lords, the VAN PEERES, the Council consisted of the Commandeur and six managers of the colony plantations, this being obviously similar to that of Policy in Essequibo. Under the Charter this Governing Council (*Raad van Regeering*) was chosen by the Governor from a double number of names submitted to him, for the first time by all the colonists, and afterwards by the other Councillors. Here as

may be seen, after the first nomination, the free planters were entirely excluded from any voice in the government, there being no Kiesheers or other elective body. It resulted therefore that the government was more arbitrary than that of Essequibo ; but at the same time, as the Charter fixed the taxes and laid down rules that could not be broken, the planters were always prepared to see that it was not infringed.

Even the Council of Justice was chosen by the other Council at first,—but afterwards by the Burghers—and it naturally resulted that the government was entirely in the hands of the Directors of the Berbice Association, most of the members being managers of their plantations, or persons unlikely to dispute their wishes. Under these circumstances Berbice developed but slowly—the colony was never opened to all nationalities, and consequently its growth was much retarded by the very fact of its having a Charter. Nowhere perhaps will be found such striking examples of the differences between a chartered colony and one that had to fight for its liberties, than in those of Berbice and Essequibo. It may look very well to have your rights, privileges and immunities secured, but what will suit admirably to-day, will be found an intolerable burden fifty or a hundred years hence.

How the Charter worked in Berbice, may be best shown by an example. When the colony was ruined by the slave insurrection of 1763 the Association was virtually insolvent and had to go borrowing—which in this case meant begging—from the States of Holland. The expenses of re-establishing the colony were considerable, and the Directors naturally expected the private planters to contribute towards these, but the latter were in just as

bad a position, and neither could nor would pay more taxes than had been provided for by the Charter. The dispute lasted for some time and was ultimately submitted to the States General, who decided to allow certain extra taxes, but not to the extent demanded by the Association. In this case the planters wanted new fortifications, but were unwilling to pay for them, while the Directors wished to throw off their own responsibilities—the Charter standing in the way of any arrangement between the two parties.

Demerara was an offshoot of Essequibo, but never a separate colony, although from some misunderstanding of the facts, English writers have spoken of the two rivers as being distinct. At first Demerara was under the jurisdiction of the Directeur-General of Essequibo and the underlying districts, while afterwards when it outstripped its parent and the Governor resided there, he became the head of the colony (not colonies) of Essequibo and Demerary.

The first Commandeurs of Demerara had hardly any authority, being entirely subordinate to the head of the colony, who paid visits of inspection at intervals. When the river became populated it was divided into two districts, and the six Burgher officers were constituted a Council of Justice, the President being either the Commandeur or one of the Councillors from Essequibo, in case none of these was able to attend the oldest Burgher Captain being authorised to preside. This was in 1766, but in the following year, on account of the growth of Demerara, an important change was made by the introduction of two Burghers into the Court of Policy. The Councillors were then the Directeur-General, Commander of

Demerara, the Captain of the troops, and three Managers of the Company's plantations. The Chamber of Zeeland now decided that only the eldest Manager should have a seat, the other two being replaced by Burghers, one from each river. The Council of Justice was also made more popular by giving Demerara two representatives, who with two from Essequibo, formed a majority of four against three official members, these latter being the same as in the Council of Policy except the Managers.

We have now something approaching to representation of the Burghers, they being in the majority in the one Council. The College of Kiesheers in Essequibo and the Burgher officers in Demerara nominated for both Councils, the nominees being selected from the most influential, pious and learned of the inhabitants, who belonged to the Reformed Church. None of these received any remuneration, but when those from Demerara attended the sessions at Fort Island, they were provided with free board and lodging.

From this time the Council of Justice began to confine itself more to the functions of a Civil or Criminal Court, while that of Policy extended its legislative functions to the whole colony instead of concerning itself merely with the Company's affairs. In these changes we do not see the inhabitants agitating for reform, but there is no doubt that it resulted from representations made to the Directeur-General by the Burgher officers of Demerara. As no criticism of the government was openly allowed, it may be presumed that the system of consulting the inhabitants on all important matters was still continued.

There now only remained the equalisation of the Colonial and Official Councillors of Policy, to make the

legislative body what it remains down to the present. This was not long in coming, as in 1773, what was considered a new constitution was granted to the colony. This was embodied in the instructions to the new Directeur-General, who was to introduce an entirely new state of things, the inhabitants and even the troops being required to take anew their oaths of allegiance. A Fiscal and Vendue-Master were now appointed to each river, and there were to be Councils of Policy and Justice in both Essequibo and Demerara, but Fort Island was still to be the residence of the Directeur-General. The Councils were to consist of the Directeur-General (or Commandeur), the Fiscal, Captain of the troops, and Vendue-Master—four Official Councillors—and four of the most influential, capable and pious of the inhabitants in each river. The Fiscal, being public prosecutor, had no seat in the Court of Justice, but otherwise the members were the same. The President had a casting vote, and no resolution could be passed unless a majority of the Councillors were present. The Burgher officers of Demerara were constituted a College of Kiesheers for that river, and otherwise Demerara was put on a better footing altogether.

As these changes, which were made by the Ten in opposition to the Zeeland Chamber of the Company, were stated by the opposition party to have separated the two rivers, the matter was referred to the States General, which ordered that the Commandeur and two Councillors of Demerara should go to Fort Island once or twice a year to meet the Councillors of Essequibo, and also that the Commandeur should be subordinate to the Directeur-General. Several of the Combined Councils—as they

were called—were held up to 1780, but owing to some coolness between the heads of the two rivers, the Commandeur was rather backward in acknowledging his superior officer.

The changes in the constitution, in the course of which alterations and additions were made in every department of the government, took about two years to accomplish, the old Councils sitting until 1775, while the first Combined Council, was held on the 26th of June of that year. When in October 1777, the Directeur-General called a Combined Council, JOSEPH BOURDA—then senior member in Demerara—objected to his holding a meeting at such a critical period, when English privateers might at any moment arrive to pillage the river. The Directeur-General in reply told him that if they did not come, the Demerara Councillors would be fined a hundred guilders each.

The English took possession of the three rivers in 1781, and were ousted out by the French the following year. Some temporary alterations were made, but generally speaking the government remained as before, Demerara taking up its position as the most important of the three, which it has since retained. Poor Essequibo did not like to lose her prestige, and when under the French, the Councillors protested that it was useless for them to sit any longer, as the Council was one only in name. They were also very much annoyed that Demerara should have sent delegates to Admiral RODNEY to treat for the capitulation of *both* rivers without consulting them, although this was shown to have been impossible.

When Essequibo and Demerara were about to be given back to the Netherlands, the Company decided to

make some radical changes which roused the inhabitants to defend their constitution. The supreme control of both rivers was vested in the Directeur-General, but the seat of government was to be now in Demerara, Essequibo being provided with a Commandeur. Councils of Policy and Justice were to be still continued distinct for each river, the members of the first however to be all servants or nominees of the Company. Combined Councils were to be held occasionally in Demerara, two members attending from each river. The new Councils of Policy were to consist of five members each, two only of these being Burghers, while it was decided that all the servants of the Company should be discharged, including also the Colonial Councillors, who were not servants. Up to this time they had been elected for life, or for as long as they remained in the colony, and therefore could not be dismissed.

The new Directeur-General arrived on the 2nd of February 1785, and at once commenced to inaugurate the new constitution by discharging all the officials, some of whom however were re-engaged. Councillors BOURDA and SWAEN protested at once against the high-handed proceeding of dismissing the Colonial Councillors, the Company being defended by ANTONY MEERTENS the new Fiscal. The Directeur-General then informed the Council that the Company had nominated JOSEPH BOURDA and PIETER VAN HELSDINGEN to represent the Burghers, on which they both declined to sit. They were already constitutionally elected, and required no further nomination, besides, it would be an invidious distinction to let them remain and exclude the other two. As there were not enough members to form a quorum, the

Council had to adjourn, first proposing Messrs. JONAS and POST, and on the latter declining, Mr. RIEM. Next day the last gentleman and Mr. JONAS also declined, on which the Fiscal proposed to submit the matter to the Burgher Officers, but the Directeur-General would not hear of such a thing, and went on with his nominating. Several more gentlemen declined, but after a great deal of pressing one of them at last consented to sit, to make up a quorum, and thus the new Council commenced its session.

Now began a grand struggle. The *pretended* Council—as it was called—commenced to make new regulations and laws, against which the Burghers stood out doggedly. As this body was not, as they considered, in accordance with the constitution, all its proceedings and orders were treated with contempt.

We have already seen that the Burghers had been ready to impose extraordinary taxes on themselves when such were really necessary. During several years preceding the conquest of the colony, it had been customary to raise what was called the colony *Ongelden* (petty expenses). This was quite distinct from the Company's taxes, but like the principal of those, it was a head-tax. From its very nature it was entirely within the control of the Colonial Councillors, both in regard to collection and application. It came about like this; the people wanted something done—the Company refused to pay for it, but said, "if you like you can do it yourselves"—hence the people agreed to contribute a fund which afterwards became known as the "Colony Chest." The Company were foolish enough to think now, that they could appropriate the *Ongeld* to their own uses, but they soon found out their mistake. They told the Burghers in

effect that they had been paying an extra dollar a head for certain things, and now that many improvements were being made they must still pay it, but this time into the Company's Treasury. The Burghers on their side said emphatically, "No! We will pay your legal dollar, which you are justly entitled to, but our own contributions will be only made to a properly constituted government that we can trust." However the double tax was imposed,—two dollars a head on all slaves—and the returns for assessment called for. Now came the tug of war. The last day arrived for sending in the lists, and hardly anyone took the slightest notice. New notices were then sent out extending the time and doubling the penalty for neglect. Again scarcely any returns were sent in, and the Council began to see that it was not so easy as they thought. The Fiscal was ordered to prosecute some of the leaders of the opposition, but they would not even attend his summons, telling him to wait until they heard from the Stadtholder, declaring also that in the meanwhile they were not going to trouble themselves about the actions of the pretended Council.

The higher authorities in the Netherlands were deluged with petitions, memorials and protests, from both Essequibo and Demerara, until the States General was obliged to take action, the result being the appointment of a Committee, which formulated the well-known Plan of Redress. This was a reversion to the constitution of 1773, with some differences, such as a limited term of service for the Councillors. As that document is nothing more than the report of a Committee, and was only provisionally adopted, we must go back to 1773 for the basis of our institutions.

The Company came to grief in 1791, mainly on account of its arbitrary doings in the two rivers, but the question of the Colony Chest—which the formulators of the Plan of Redress had left over for further consideration—caused some trouble in the last decade of the century, and ultimately gave us the Financial Representatives. Governor GROVESTINS, the Administrator under the new *regime*, when the colony was placed with others under the West Indian Council, was considered to be a little arbitrary in his use of the casting vote, applying the Colonial Fund to pay administrative expenses which should have been provided for from the Government (late Company's) Fund. The Colonial Councillors were often outvoted in a matter that they considered should be entirely in their own hands, and complaints were again made to the home government, but on account of political events no definite action was taken. However the Governor was authorised to use his discretion in admitting more representatives into the Council to vote on matters connected with the Colonial Fund and its expenditure, and went so far as to ask his superiors to allow two of the Kiesheers to be adjoined for that purpose. Before anything could be done however, there came—in 1795—a little revolution in Demerara. The Governor, being an adherent of the Prince of Orange, suddenly left the colony at a most critical period, and there being no one who would venture to take over the administration, the people met together and decided to do without a Governor, two of the Councillors being delegated to have the supreme authority for a fortnight in rotation. A slave insurrection at the same time cost a large sum to suppress, and as this was one of the

matters paid for out of the colony chest, two Kiesheers from each College were adjoined to the Council of Policy to advise as to the best means of raising the amount. This decision was made on the 23rd of June 1795, and it may be fairly considered that our Financial Representatives date from that time.

The following year the three rivers were taken by the English, the inhabitants, by the articles of capitulation, being guaranteed against any infringement of their "ancient laws and usages." This guarantee was continually being quoted in after years, every proposed alteration or improvement being met by the cry that it was contrary to some old custom or law. The first Governor under British rule was ANTONY BEAUJON, who, being already Governor under the Batavian Republic, was allowed to remain. He had permitted the Kiesheers to sit in the Council, but one of his first actions under the British was an attempt to abolish this privilege. BEAUJON apparently wanted to put both "Chests" on the same footing, but the Colonial Councillors protested against this, declaring that the Finance Department ought to be continued as one of ancient usages, which although only lately adopted, was founded on old rights and privileges. The Governor on the contrary said it could not be so considered, as it was at the most only provisional, and had never received the sanction of the States General. However, he proposed on the 10th of June 1796, what is virtually the present Financial College, for which an Ordinance was finally passed, and published on the 21st of the same month. Six inhabitants,—three from each river,—were to be adjoined to the Governor and Councillors of Policy, "with a right of

voting only for the raising of Colony Taxes, and not further," these to be elected by those inhabitants possessed of twenty-five or more slaves, and to serve for two years. The electors were admonished "to observe in the election of such Representatives, that they invest their interest in the hands of those, who from their connections, will take the real welfare of the Colony in general, and that of the inhabitants in particular, to heart."

So little interest was taken in the election of the Kiesheers at this time, that on the 8th June 1796—the Commandeur of Essequibo having reported that only four votes were found in the box—it was resolved to issue a publication earnestly exhorting the people not to neglect this part of their lawful constitution, as in case they failed, some steps would have to be taken to maintain it. When, in 1807, on the petition of the inhabitants of the district, the boundary of Demerara was extended from the Boeraserie to Bonasika Creek, one of the Councillors living in that district, who had been elected as a representative of Essequibo, was considered no longer competent to sit, and the Governor ordered the Kiesheers to make the usual nomination as for a vacancy. The Kiesheers, instead of proceeding in the regular way sent a nomination, with the remark that they did not consider the change of jurisdiction sufficient cause for a new election, but as the retiring Councillor had not acted quite as he should, they had thought it best to comply. This was considered so impertinent, that the Governor and Councillors passed a resolution, that they had read the remarks with the utmost surprise, as from them it appeared as if the Electors arrogated to themselves

the right of deposing members for pretended misconduct, and of appointing others as they thought fit. The nomination was sent back with a copy of the resolution, on which the Kiesheers made excuses, which however did not satisfy the Governor, who dismissed all of them except two, who were in the minority, and ordered a new election, telling the Council that he acted in this as His Majesty's representative and would allow no discussion.

In 1812 the then Governor, HUGH LYLE CARMICHAEL, took upon himself to abolish the Kiesheers as a separate body, giving over their duties to the Financial Representatives. In view of what may now be considered as the final abolition of the College, it will be interesting to give that Governor's opinion of this part of the constitution. In his address to the Combined Court on the 18th of November of that year he said :—

“ This being the first meeting of the Combined Court, composed of the Court of Policy and the Kiesheers in their capacity of Financial Representatives—a new formation of the latter body—I think it proper to state that I received particular orders from H. R. H. the Prince Regent, which I have carried out to the best of my ability. I conceived that in effecting this important change—which must be attended with inconvenience to many individuals—the most conciliatory means should be applied, and in those sentiments I am happy to say, was cordially supported by the Honourable Court of Policy. In the course of the various arrangements that ensued much matter developed that appeared as if it might ultimately prove prejudicial to the constitution. To certain concurrent circumstances—unnecessary at present to revert to—I thought it proper to put in execu-

tion an original plan, which temporary incidents induced me to defer—that of dissolving the Board of Kiesheers remaining from the former system of the separate colonies, which did not appear perfectly congenial to the one now existing. It therefore appears to me the most judicious mode to dissolve the Kiesheers and take the general sense of the freeholders.”

He then went on to describe the British Constitution, “which all agreed was the most perfect that could be found,” and the nearer any Government approached that, “the more it will approximate the zenith of human wisdom.” This he had kept in view in making the change, and he did not think that the “early institutions of an infant settlement” ought to stand in the way of progress. In a former speech CARMICHAEL told the Court of Policy, that the Kiesheers should not retain their seats for life, and that it appeared to him reasonable and proper that the “proprietors and freeholders who delegated the Kiesheers should have their privilege periodically restored to them, as is practised in the most perfect of all models of legislature—the British Parliament.”

Matters had been brought to this crisis, partly by the abolition of all distinctions between Essequibo and Demerara, which had just taken place, but more immediately from the fact that the Kiesheers, being nearly all Dutchmen, persisted in nominating for both Courts of Justice and Policy, only men of their own nationality, so that the English, who were really the most important, had no voice. Under the new arrangement the election for life was abolished, the constitution of the new body being that of the Financial Representatives, with an

extension of the Franchise to those who paid income tax on the value of twenty-five slaves.

The Secretary of State did not altogether approve of the Governor's action in this matter, but allowed the alterations to remain, only telling him that he objected to the adoption of any plan of a similar nature without previous reference to His Majesty's Government. It was not therefore a very gracious act on the part of the British Government to re-establish the College of Kiesheers on the union with Berbice in 1831. In the preamble to the Ordinance it is stated that CARMICHAEL had no authority to make the change, and that it had never been confirmed or allowed—rather a sweeping assertion to make when it had remained without dispute for nineteen years. What makes it the more curious is that there were neither Kiesheers nor Financial Representatives in Berbice, and it does not appear that any objection to the existing state of things was made by the people.

Beyond the re-establishment of the Kiesheers, very few changes in the Government were necessary at the union of the Colonies. Berbice had retained the old system, except that, in 1826, the nomination to the Council of Government was entirely vested in the hands of the Governor. At the union, the constitution of Essequibo and Demerara was chosen to be that of British Guiana, Berbice gaining by the change, as there had been hitherto nothing like a representative government in that colony. The old Court of Justice was now abolished and replaced by three Judges and three Assessors, the latter being chosen in a similar manner to the present jurors.

Very few alterations have been made since that time.

Changes in the number of Councillors of Policy, from eight to ten, and in the status of the officials entitled to sit have however taken place, the Governor being the only one of the Officials originally entitled to sit who retains his place, although the Attorney-General may be said to represent one of the Fiscals.

On the abolition of slavery, alterations in the franchise became necessary, the possession of twenty-five slaves giving place to other qualifications, but the most important change of that period was the amalgamation of the Colonial and King's Taxes. Both of these had been mainly head-taxes on slaves, and now that other arrangements were necessary, a Civil List was formulated representing the amount of the King's Taxes—which it must be remembered never were under the control of the Combined Court. In consideration of that Court's guarantee of the Civil List, the King's Chest was abolished, and the whole of the taxation and expenditure placed under its control.

This Civil List has caused more trouble in past years than any other part of the constitution, the Colonial Councillors and Financial Representatives being under the impression that they could do what they liked with it. When however it is considered that the Government might have made arrangements to retain the King's Taxes in some other form than that of head-money, when they would have been entirely beyond the control of the Combined Court, it will be seen that the Governors and the Colonial Office were right in refusing to let the Civil List be cut down indiscriminately. When it is remembered that the King's head-tax, if still in existence, would now yield a revenue of over \$280,000, it will be seen that

the Civil List has not gained anything by the change. Little can be said here concerning the disputes on this great question,—which resulted on two occasions in the stoppage of supplies and the arbitration of the Governors of Trinidad and Barbados,—as too much space would be required, it may be stated however that nothing of importance was gained or lost by either party.

As early as 1838, reform petitions were drawn up in Berbice and Demerara, and when the first Civil List dispute was pending, in the following years, meetings were held in favour of altering the Constitution. The *Gazette* in 1841, had a leader on the subject, which said they wanted reform of society rather than government. The truth was everybody was too much engrossed with his own affairs to give much time or attention to public matters. The writer was in favour of the abolition of the Kisesheers, but did not expect any result from the agitation at that time, in which opinion he was justified by the fact that nothing whatever was done.

Messrs. EMERY, TAGGART and the Revd. E. A. WALLBRIDGE were the leaders in the later reform agitation of 1845. In a petition from Smith Church to the Combined Court it was stated that the Established Churches were originated for purposes adverse to the political rights and liberties of the people, and that they were powerful barriers to the practical recognition of the just claims of the once-enslaved but now emancipated inhabitants. This was considered as a libel and was referred to the legal authorities, who reported it to be seditious according to English law but not to Dutch, so no action was taken.

The whole discussion was carried on at that time in such a virulent manner—especially by the reform party—

that it is no wonder nothing was done. A petition to the Queen was drawn up, asking that the whole of the existing legislative institutions should be abolished, and that in lieu of them a Council and Assembly be substituted. Governor LIGHT was in favour of the abolition of the Kiesheers, although he thought the Colony "totally unfit" for a Council and a House of Assembly, instancing the Mayor and Town Council as a complete failure, as they wanted to be paid for performing their Magisterial duties, and had to be replaced by a Police Magistrate.

At intervals during the succeeding years, especially under the administration of Governor HINCKS, reform agitation was continued, but although the more intelligent members of the community were willing to have the Kiesheers abolished, nothing was done. Finally about two years ago the matter was again brought forward, with the result that a petition to the Queen was drawn up, in answer to which an Ordinance was passed that came into operation on the 1st of August 1891. The principal changes made by this are the abolition of the Kiesheers, replacing them by regular voting, and the increase of the number of Councillors of Policy to sixteen, the numbers of officials and representatives remaining equal as before.

Although the constitution of British Guiana is not perhaps "the most perfect that could be found"—as Governor CARMICHAEL said that of Britain was—it nevertheless seems well-suited for our mixed population. With such a large number of ignorant and half-educated people, anything like manhood or household suffrage would be quite out of the question. The great difficulty here is—and always has been—to obtain representatives who will be able and willing to devote their time to public

duties There are no landed gentry or retired merchants in the colony, and it cannot be expected that men who have to look after their estates and businesses will ever be able to pay as much attention to public duties as these require.

*Notes on Engine Management.**

By G. W. Rockcliffe.

IN consenting to read a short paper at this meeting I have chosen a subject which may not be familiar to the majority present, yet as it occupies an important position in commerce, it thereby claims a place under the wings of this Society.

Without entering on the broad theories of the subject which could occupy a good deal of time, I would request your attention to that most practical portion of engineering with which we are all connected in a greater or lesser degree. The merchant and the members of his establishment, and through them their staff of customers, and by them the vast army of consumers, are all interested in the management of the steamers' machinery which bring the merchandise from the markets of the world to the Port of Georgetown. The very many off-shoots of mercantile traffic in the distant parts of the province are interested in the engine management of the local steamers, as well as in the propelling force on our twenty miles of steel road.

I can also allude to the judicious machinery management required in producing the golden grains which form the chief staple and backbone of the country; but probably one of the gentlemen directly engaged in that connection will favour us with his views on that section, and I would therefore confine my notes to marine machinery.

* Read at the May Meeting of the Society.—Ed.

The first point to which an Engineer directs his attention on shipboard is the boilers, those generative structures which are the be-all and end-all of his labours, which I may also term as the head and shoulders of his professional existence, and which require attention as careful as that bestowed on the most intricate kinds of mechanism.

As the boilers are the source of power, so also do their proper management form the basis of safety. As they happen to contain the generated force necessary to the propulsion of the vessel, so also are they the platform on which the first principles of economy in the engine room can be exercised.

Fuel is the leading substance in steam production we all know, and the Engineer has to guard its consumption with jealous care, and persistent watchfulness, for what may be considered trivial where a shovel full of coal is the topic, devolves into a very serious matter indeed when the voyage is a long one and the stock is small. It may be of interest to mention that Engineers have had to go into the bunkers of small vessels at sea and give each stoker his allowance, and have been careful in the collecting of small coal and ashes, so that nothing might escape, with the object of having sufficient to make the next port. In fact whether the consumption at sea is 4 tons a day as I have been restricted to more than once, or 300 tons which is about the daily amount used in the stokeholds of the "Atlantic Greyhounds" the same principle of economy applies and is respected; and whether the fuel is the costly coal or the dangerous petroleum, the condition in which the boilers are kept, and the manner in which the fuel is used, determine either the safe-

guarding of the owners' interest or the virtual casting of their money into the sea.

One of the Engineer's primary duties, therefore, is to keep the boilers clear of all foreign matter, which means that nothing shall find a place between the fire and the one surface of the metal in the first part, and between the water and the other surface of the metal in the second part; thus leaving the metal of which the boiler is composed as the sole intermediary between fire and water. The reason is obvious, as the more mud or other like matter, that goes between the elements in addition to the metal, so in the same ratio more fuel is necessary to generate the steam until the impossible point is arrived at, that is when the water can no longer penetrate the impurities to reach the metal, and the fire on the other side then softens it to such an extent that a collapse occurs; and if even an explosion is averted the boiler becomes unfit for immediate service.

This principle has been well kept in view by Marine Engineers, and Mr. MANUEL, the Superintendent Engineer of the P. and O. Steam Navigation Company, in his inaugural address last September, as President of the Institute of Marine Engineers, on referring to this subject said, "It is an exceedingly rare occurrence for a boiler to burst on board ship, while on land it has been otherwise, many lives being lost annually by explosion of land boilers. The inference is that the greater care and attention bestowed upon the former speaks for itself in comparison." And in the majority of instances greater care means greater expense.

The Engines are the points of interest to which I shall next refer. When an Engineer enters his engine room for

the first time, he has to acquaint himself almost at a glance with the constructive style of his machinery, their peculiarities and perhaps their perplexities ; also to trace the various connections, as his intimacy with their source and delivery is at once essential. It sometimes happens that he is appointed to a ship and joins her when ready for sea ; it can thus readily be understood that his glance must be quick and sure.

The principles of Marine Engine construction are thoroughly comprehensive, and the man who knows his work is generally prepared at every point to deal with the intricacies which may confront him, but when he is suddenly brought to face a special type, or deal with a patent he has never seen, on his quick perception depends the success of his task.

The development of construction, and the improved methods for the rapid handling of cargo, and for the increased comfort of passengers within recent years have proportionately increased his duties, and here I may note that when he finds himself in charge of an electric lighting installation—his previous experience being probably only a look at the light—he has to become an electrician in a very short time.

Two of the great qualities necessary in an engine room are promptitude and nerve, and the man who is always prepared to deal with an emergency in addition to his ordinary duties is on the sure road to success ; thus it is not a matter for surprise when a man who is otherwise competent, abstemious and conscientious, but who takes a long time to decide on a course of action, gets distanced in the keen competition which is a distinctive feature of the high pressure life we now live, by the

man whose theories may not occupy a very prominent altitude, but who through prompt action saves time and expense and probably prevents the loss of the ship with valuable lives and a rich cargo.

The vital parts of an engine in operation are hid from view. Steam we know is invisible, and for it to perform well its part it must remain so, therefore it is the duty of the Engineer to keep it within bounds. The effecting of this purpose is a sound principle, for apart from the major consideration of waste of fuel, there are the evils of loss of efficiency, increased temperature, and the noise caused by escape; which latter, however annoying it may be to passengers, is more so to the man upon whom every eye is turned for the suppression of the inconvenience. This is not very noticeable in large vessels where the machinery is encased at a good distance from the passengers, but in our little coasters where for purposes of ventilation all the available space is open, such an experience is decidedly uncomfortable, and it is here that the Engineer in preserving a calm exterior when vexation rages in him, and the imprecations of his thoughts are unuttered, brings the quality of self-restraint to the fore. The experienced traveller can appreciate this, in persons who are in command.

Now here a peculiarity asserts itself. It has just been advanced that on keeping the steam invisible depended its efficiency, which is a firm truism in steam practice; yet it can be so kept and still lose a large percentage of its utility; to explain this, however, I will enter on one or two technicalities.

The slide valve is the arch-regulator of the machinery. It admits the steam at intervals of each stroke at each

end. When one end of the valve allows an opening to one port or steam passage, it must be closed to the other, and steam must pass only at that point. If the face of the valve is not steam tight, that is, if steam passes between it and the cylinder ported face against which it works, and gets into the passage where it is not wanted at that portion of the stroke, its efficiency is lost, and it can then be said to be working against itself. After the steam shall have been properly allowed to pass through the ports it enters at each end of the cylinder alternately, and whilst it is thus admitted on the one side the exhaust is taking place on the other.

Now it is plain that if the piston is not a true fit in the cylinder the steam will pass from one side to the other, irrespective of the alternating action that should occur, and thus a portion goes through the exhaust without doing its work and the efficiency of the engine is seriously crippled. It must be remembered that all this is taking place under cover, and the man in charge should know from the manner in which his engine is working whether he has a leaky valve or slack piston to deal with. Herein lies the strongest link between the engines and boilers, for the two defects just named are the most silent though doubly perverse destroyers of economy in fuel consumption with which a man can possibly have to deal. The working of machinery, even of the most perfect type, is attended by a certain amount of noise, and the engineer very soon gets acquainted with the various noises and their centre of origin, and it matters not how many they may happen to be, the slightest strange thud or squeal is immediately noticed and its source invariably detected.

Thus in the management of machinery the two most important of the human senses are keenly tested.

There is another severe trial to which our friend is occasionally subjected, and that is a "break-down," and in this connection one of three causes generally operates; they are defective material, faulty construction, and indiscreet management; observe, however, that only when mishap is due to the former that it can be classed as an unforeseen circumstance.

Except in places where severe tests can be applied to material, its quality to a great extent must be taken on trust; therefore it is the more perplexing when a break occurs on a part of the machinery where a defect was least expected; and when that part is indispensable the perplexity is intensified.

Time would not permit me to deal with the shifts and expedients resorted to by Engineers when placed in such a position; sufficient to state that breakdowns have proved to be their real friends; as many a man never knew what ideas of design and construction were latent in him until he was brought to face what at first appeared an insuperable difficulty. Faults of "construction" to the ordinary mind is a lesser evil, for where there is a fair share of intellect and an absence of pecuniary difficulty, *re-construction* can be resorted to, and the chances of a breakdown reduced to a minimum. Many circumstances can combine to produce "errors in management," such as allowing a known defect to remain too long unattended to, with the hope of saving expense, or a desire to gain as much time as possible on the voyage, which, however laudable they may be in the abstract, yet are fraught with danger to life and limb. Cautious persons will say

"run no risks," but they can hardly to the satisfaction of the Engineer define the point where assurance ends and risk commences, thus in his judgment, and that alone, the factor of safety is constituted. It is necessary therefore to be "to his faults a little blind and to his virtues not unkind."

I cannot leave this subject without alluding briefly to the short credit which falls to the man who works the engines. It is generally said when a steamer makes a fast passage that Captain Somebody has made a splendid run, and he as a rule enjoys the credit thus accorded him; but when a long and expensive voyage is discussed he is almost sure to say "I cannot make the engines go, you must ask the Engineer about that." It is very far from my intention to rob the shipmaster of his *glory*, but am shewing that the man below is deprived of the honour due to him, and in support of this I will quote an article from one of the leading trade Journals.*

The vessel alluded to is the "City of Paris" when she broke the record, making the run from Queenstown to Sandy-Hook in less than six days, before the lamentable disaster which occurred on the 25th March last year. "Much interviewing and complimenting" said the article "was done on the American side, and it is a curious fact that all were rendered to the captain rather than to the engineering department. Without detracting from the credit due to the captain and his officers for their skilful navigation, it is obvious that they would be helpless in producing a fast passage were it not for the co-operation and skill of the engineering staff. Rapid passage now-a-days are due in the first instance to the

* "The Marine Engineer."

excellent design of the vessels and engines, but the untiring energy and watchfulness on the part of the staff below are chiefly responsible for the success. It is evident that the engines and screws drive the ship, and it is only the engineers that have the technical knowledge and skill to get more or less out of the boilers and engines in a certain time." Now when it is considered that the engineer of that vessel had a staff of 175 persons, about one-third of whom were always on duty, it can readily be conceded that he deserved at least honourable mention for marshalling his men in such a manner as to break the record.

Locally my experience has been in the same direction, and I have often heard the captain on the bridge being complimented by the passengers for the smart passage, when his course allowed of very little deviation, while the man who has strained every nerve to keep his engines lively, and has probably been down among the coals to keep his stokers in order, does not even receive the crumbs from the sumptuous feast of congratulations offered the man whose skill was but a small factor in the results so highly praised.

I may have digressed somewhat from engine management to a point in the social status of the engine managers, but I think the digression is justifiable when it endeavours to show that down below, in what have often been proved to be moving tombs, are to be found men of sterling worth; and that ship-owners, under-writers, insurance companies, captains, and the general public, owe a great deal to the alertness and calm judgment of the man who handles the levers.

*Reminiscences of the Port of Georgetown.**

By Capt. Montague Jones.

MY first impressions of Demerary in September 1854 were anything but favourable. It was early on a Sunday morning when I landed from the anchorage off the Fort, and as the tide was low, and still running out, I pulled close in shore in the slack tide which gave me an opportunity of seeing and judging for myself what was the cause of Demerary bearing such a bad reputation, so much so as to be called the white man's grave.

Having been informed by the pilot that the Market was kept open on Sunday mornings, I availed myself of the opportunity of seeing it and getting a supply of fresh meat, vegetables, and fruit, after a six weeks' passage from London.

Had I been appointed to survey and report on the condition of the harbour, I could not have had a better opportunity, or taken more notice than I did, and little did I think that I should be invited to relate what I observed:—Huge piles forming wharves, commonly called stellings, under which a deposit of all kinds of refuse of vegetable and animal matter in a state of decomposition, giving a very offensive appearance. Many of the merchants with their families and employées dwelt on the premises over the wharves, and frequent fatal cases of yellow fever occurred during certain seasons, really epidemic. Young men lately arrived from the

* Read at the May Meeting of the Society.—Ed.

Mother country, were carried off in a few days, so that it became quite a household saying, that if so-and-so got over the springs (tide), he would be all right ! Others were said to go off with the springs.

Now I should like to ask what had the noble river intended by Divine Providence for the benefit and health of mankind, to do with this matter ? Facts answer for themselves.

If the first settlers in the colony had been satisfied with a more simple method, by keeping a more clear and clean sea shore, or building a sea wall of moderate dimensions, there could not have been a more healthy port.

Georgetown has been described by a recent writer, as "a Transatlantic Eden," and so it should be, but he only saw the sunny side, and not the *bête noire* on the river. Let us go back to the first setting of the harbour. Stellings were erected at convenient distances from the sea dam now called Water Street, which shows itself still between the Railway and the Fort. And by continually extending them for the convenience of those proprietors most interested, we now see the immense growth of irregular wharves, the outlying ones employing all the advantages thus obtained ; for it must be noticed, that at the extent of an outlying wharf, the tidal current especially with the ebb, runs with more velocity ; even with the ships alongside it causes a scouring of the mud, which finds its way and settles on the next lots, the owners of which in turn, are obliged also to extend before they can make use of their own. Things have been allowed to go so far that it is now high time to stop. I have noticed years ago at Archangel, also at Bordeaux, both ports

on the banks of rivers, that the wharves facing the town are built with a gentle slope. Ships lie afloat in the stream and the cargoes are taken in and discharged with barges. I have been informed that since I was at the former port, a perpendicular sea wall and dock have been built.

I never had an opportunity of fully expressing my views and observations on this matter, during my former residence in this colony. The late Hon. HENRY SANSFIELD BASCOM had an idea of erecting a bridge across the river, for which he obtained elaborate plans. I often conversed with him on the subject with which I could not agree; and recommended rather to have a seawall on the left bank of the river, which would form a delightful boulevard, with a sanitorium, a Marine Hotel, &c., &c. There is no question that the town should have been built on that side, were it not that the opposite bank (Georgetown) afforded better shelter for the shipping. From the steamboat ferry to the groin at the Best the position is not unlike our seawall, having no obstruction for the sea-breeze which is felt in the city.

Complaints have been made from time to time about the silting up of the Demerary Bar, but I say there is nothing to fear on that score. I have known, after a protracted dry season in 1865, a silt making across the bar, but that soon disappeared with the next heavy wet season. Upwards of 30 year ago, Liverpool ships (Messrs. SANDBACH PARKER & CO.'s) sailed in and beat over the bar, drawing frequently over 19 feet; steam tugs for towing were not available in those days. Those ships were adapted for the Port, being short and deep with rising floors, and sharp bottoms, which enabled them to

cleave through the mud and go about readily. Our modern ships of great length and flat floors could not be handled in the same manner, and have to be towed. Now that the navigation is almost confined to steamships, there is no danger to be apprehended, as the mud is stirred up so frequently, it is sure to keep the channel deep. An old Captain well known here once offered to undertake the dredging of the Bar for a certain consideration, which I consider a great mistake to attempt to keep a channel deep with mud constantly filling the space. Georgetown keeps on a rapid pace in improvements and embellishments, but never will be what it ought to be made until a radical change is made in the Port.

I will now say a word or two on our Fort at the entrance of the river. Long may it stand to protect the town from encroachments of the mighty ocean; but alas, in a military point of view with its present armaments, its occupation is gone. In 1862 when Demerary possessed a Militia (*en force*) that is to say, Cavalry, Artillery, Rifle Corps, and 4 Line Companies, besides a good garrison of Imperial Troops, there was something like soldiering in the colony. I was requested on one occasion to assist in a project for target practice from the Fort, and accordingly placed the target (a ballahoo) with a staff 11 feet long, surmounted with a blue flag in the ship channel about 1,200 yards from the shore. Great curiosity prevailed in town, and a goodly number of citizens went to witness the practice and see what the guns could do in reality when required.

Some vessel arriving during the previous night had run down and sunk the target, so nothing remained for a

mark; but the Commanding Officer ordered to fire on the white buoy, against which I remonstrated, but was told that if any damage were done it should be made good. So the order was given. "Action right! No. 1, Fire!" All eyes were directed seaward to see the result when "Bang" went the gun, and the round shot was distinctly seen whizzing through the air, making a beautiful curve and falling a long way short of the mark. Nos. 2, 3, and following guns in succession with much the same result. One round shot was fired at almost point blank, making a beautiful ricochet for a great distance but falling considerably short of the mark. Then live shell was tried to no effect, and, as the sun was lowering, the flash at the explosion was distinct and brightly displayed with the fragments flying in all directions, but no damage was done.

But the *grande pièce de résistance* was one of the guns near the end of the battery, looking seaward, which was the crowning point, for on recoiling, it made quite a summersault backwards, and fell into the trench where it remained for a long time like a warrior at rest. The Commanding Officer some time afterwards informed me, that on the matter being reported at headquarters, it was decided that the guns should not be replaced; but that gun-boats or a floating battery would be substituted; they are yet to come.

Military tactics are not my study, but I know this much, that in the event of any enemy or filibuster force making an attack, we are powerless to defend ourselves as, with modern Ordnance, the city could be shelled from miles off.

A word or two with your kind permission on the

sanitary condition of some of the finest harbours of the world.

Take Rio de Janeiro to begin with ; not a finer harbour to be found, quite like an inland sea. The river from which the Port derives its name, flows in that large expanse, but has no effect on the frontage of the town, which is built like an amphitheatre, affording, and could not be better adapted for, drainage ; but the misfortune is that there are no means of scouring. As far back as 1842, all the soil and refuse was taken down after sunset and deposited on the beach right in front of the town, and actually before the Imperial Palace. Subsequently, I should say some 10 or 12 years later, a grand scheme was carried out by an English company to drain the whole town with ample means of a supply of water brought down from the mountains, which had the desired effect of draining. But sad to relate ! for want of a stream to carry and disperse it in the distance, the nuisance remains in a most offensive manner.

Let us now visit Port Louis in the Mauritius, a most lovely harbour, between a sand and a coral reef backed by lofty mountains from which descends a gentle stream which supplies the town and shipping with pure water ; but so feeble as to be neutralised in reaching the harbour where all the drainage and impurities settled so as to produce an almost black greasy mud, while outside at a very short distance the sea is quite clear and transparent shewing the magnificent growth of white coral and sand, acquiring various hues according to the state of the atmosphere, sometimes with a bright sunshine and in shallow water, beautiful emerald green, while in the distance, almost purple. How very different at the port.

We will now visit Havana, styled by the French "La Perle des Antilles," a beautiful harbour land-locked, of great space, and well defended, but like the former, no stream running into the sea, hence all the evils, which civilisation and opulence accumulate and deposit in the harbour.

I may say the same of St. Thomas, in much the same terms. The harbour is well adapted by nature for a port of ordinary safety and trade ; but not so in a sanitary point of view, as the high lands intercept the sea breeze or trade wind.

Now let us come back to Demerara, and see what could be done with the immense volume of tidal stream running through the harbour twice in 24 hours, with a sea wall and river frontage. Then what a grand dock could be made at Kingston, which could be flushed at the entrance to advantage with the Lamaha and other trenches. The present dock of Charlestown has done great service but at a great deal of labour and expense, for the want of a powerful service for flushing off the entrance where the mud outside accumulates.

We may not see the day, but I hope it is not very distant, when Georgetown will merit the title of the gem of the Magnificent Province.

*Opening up the Country.**

By W. W. Kenrick, Gold Commissioner.



HEN I was honoured by a request from the executive of the Royal Agricultural and Commercial Society to address this meeting and give my views and expression to the opinion I was forming of British Guiana, I felt that a better and more fitting subject might be found to lay before you this evening, and I venture therefore to express my views upon the all important question which is now engaging public attention and beg to claim your fullest indulgence while I tell you what I can in the limit of time allowed me, upon "The opening up of this Country."

During the first $\frac{1}{4}$ ths of the Nineteenth Century, America, India, and Australia have respectively in their turns occupied all the attention which Europe has had to spare for matters abroad, but now Africa, which up to a few years ago was looked upon as a sealed volume, whose contents were but dimly known excepting to Arabs and slave hunters, is coming to the front, and the mist of ignorance and doubt which has for centuries enveloped it, is now passing away with startling rapidity. But how is this marvellous change being brought about in reference to a country which has so long rested in darkness and mystery?

It is traceable to several causes, but the chief one is the discovery and development of its mines and minerals. Only the other day your ideas of South Africa

* Read at the June meeting of the Society—Ed.

were chiefly associated with such unfortunate occurrences as took place at Majuba and Sandhswana, but what a marvellous change within so short a time. Let me tell you a few plain facts, and give you some startling figures connected with that beautiful and romantic land.

Within the past 20 years—South Africa has shipped over 50 millions sterling of diamonds to England, and within the last $3\frac{1}{2}$ years from the one district of Witwatersrand, in the Transvaal, virgin gold to the amount of five millions sterling has been exported to Europe. These figures when taken in connection with time and place constitute imperial facts, and will, as such, bear and deserve the closest analysis.

I have nevertheless to admit that the true wealth of a Country or Colony is that of its soil, this being the gospel of political economy which poets of all time have ever sung, and when poets and political economists affirm a principle in mutual accord, it is hardly for us to differ. At the same time in these days of the Nineteenth Century and in face of the growing requirements and necessities of mankind, I submit that whilst valuable as the land of sugar may now be, greater and more valuable still will it become when it develops and utilizes to its fullest extent, the precious gems and valuable minerals it has been proved to contain.

To prove and verify, if verification were necessary for the well known and admitted truism of my statement, let us look at California and Australia—lands which flow with milk and honey, rich in the productions of their soils; and yet where would be the development of these natural treasures if it were not for the golden and continuous harvests being reaped in the mountains of America's

Western States and in the plains of Ballarat. By virtue of this superadded mineral wealth, America, Australia, and other countries have, during the last half century, come to the fore and are now nations which have to be reckoned with in the making and movements of the civilized world.

In a similar manner and judging of the future by what has been of the past, it will not, I think, be presumptuous for the people of British Guiana to look forward to their country becoming in fact, as well as name, one of the most prosperous in South America, and as important and well known in the coming future as it has been insignificant in the past. In these days of severe competition and depression there is primary necessity for pushing British interests in new districts and new places, and this becomes more and more apparent.

If the English Government will look to the interest and welfare of its own subjects and less to those of other people, it will be of great advantage to us, and many of the misfortunes which have overtaken us in our financial investments will be avoided. If we are driven out of the European field by continental cheaper manufacture, we must look to our Colonies, and particular interest must soon be attached to this country when its mineral wealth, natural resources and capabilities are brought home and before the capitalists and investors in the outside world.

The silver mines of the globe are now producing too much of that valuable metal in comparison with the quantity of gold being obtained. This over-production of silver can only be balanced by an increased production of gold, and British Guiana by becoming a bullion exporting country will thus not only be benefiting and

enriching herself but be contributing towards the prosperity of the world in general.

It is a proud statement for Englishmen to make and be able to assert that, where the English Flag waves, all find shelter and protection beneath its folds. Rights are respected and security and order ensured.

This opening up of the Colony and the vast country pertaining to it for the employment of British capital is, at the present opportune time, one of the most important and urgent that the people of British Guiana can enter upon, and will repay the most serious efforts of every one who has the interest of himself with that of the Colony generally at heart. It is to this end and with this object I beg to claim your careful consideration. Now what has this Colony done towards the serious development of the resources which nature has bestowed upon it with such unstinted abundance?

On referring to the official Year Books and other official authorities and thus necessarily correct informants, I read that the country of British Guiana is credited in round numbers with an area more or less of 110,000 square miles, (but I believe it is much greater), and it came finally under English rule in the year 1803 at which time the Sugar exportation had been brought up to 35,840,000 lbs. and the Coffee to about 10,000,000 lbs. In 1888 the population equalled 278,477 inclusive of 154,088 native born in British Guiana and the West India Islands (the census just completed by the way is not flattering).

The export trade is now chiefly confined to sugar—coffee and cotton being productions of the past—your railway system is comprised in a short line of 21 miles in length, and the telegraphic lines do not reach 300 miles.

After being nearly 100 years in the possession of this country, you have brought into cultivation about 130 sq. miles of it, leaving over 108,000 sq. miles of the finest, best, and healthiest portion unutilized and unexplored; so true is this that I am assured by those most competent to judge, that it would be impossible to find 20 men in the City of Georgetown (exclusive of the Gold Diggers) who have travelled 50 miles inland from the coast:—What would be thought of a man who had to make his living by farming and who while renting an estate of 5,000 acres was contented with the cultivation of his kitchen garden of 5 acres? We should consider him to be either a fool or a lunatic, and yet this is the sort of policy that has been, and is being pursued in British Guiana at the present time—your very existence and prosperity depending upon the single product of Sugar, produced from a single strip of alluvial land on the Sea Coast. Compare this deplorable and humiliating state of affairs with the enterprise and energy displayed in other countries.

Natal was formerly taken over by the English government in 1845 or 45 years ago; its area is about 1-6th that of this Colony or 18,000 square miles, and it possesses no rivers that are navigable.—In 1888 it had 233 miles of railway in working order, with a similar length under construction, 500 miles of telegraphs, giving an income of £17,000, while its railway receipts were £347,982 against an expenditure of £199,364. The total revenue of the country was £990,614 or more than double that of this large colony whose expenditure I observe was £30,000 in excess of its income.

Take another instance and give a passing glance

at New Zealand, whose area of land is also somewhat less than that of British Guiana, and let us see what she has been doing, while you have been dreaming away your existence. In the 50 years of occupancy under British rule, the population has increased to 650,000 people. Its revenue in 1888 was £4,109,815. The acreage under cultivation was 1,390,000, and of cultivated grass lands 62,793,311. Now much of this progress and advancement is to be attributed to the development of its mineral resources—the gold export having risen in 30 years to over £44,843,642. Comparisons are said to be odious but in this instance they are necessary, for, to know ourselves, we must see as others see us.

Exploration and discovery in New Zealand is still going on ; the quartz reefs are continually and steadily being developed, and the yield of gold therefrom is annually increasing, while that produced from the alluvial workings has been gradually decreasing. I therefore look forward to a regular growth in the product from the Quartz Mines, and it is upon them eventually that the permanence of your gold harvest will mainly depend. The enormous amount of capital invested, the large number of men employed, the valuable plant and machinery provided for treating and smelting the ores, must tend to secure for this class of mining in that Colony a beneficial and lasting prominence. The total area of gold and silver lands proved in New Zealand, equals 21,000 square miles, both metals having been found over that area in numerous localities, from Stewart Island in the South to Cape Colville in the North.—So much for pluck, determination, and enterprise.

To explain away the cause of stagnation, want of energy, want of go, indifference and apathy which has characterized this Colony, it will be urged that the climate is unhealthy and must not be compared with that of the countries I have referred to; this is the case certainly with regard to New Zealand, but not so with Natal. And as your experience is confined to only a fractional portion of your country or to the low-lying mudflats of the coast, a biased opinion has been formed, and the climate unjustly condemned and put forward as an excuse for the lack of energy displayed.

The climate and temperature of the coast land of Natal, and South East Africa generally, is in every way similar to yours, and I have no doubt whatever in my own mind, both from my own limited experience of the interior of British Guiana, and from the information given to me by others, that this country possesses a climate equal for healthfulness to that of Natal and any other Colony. The evidence given before the Commission confirms this, and we learn that you possess a rich and beautiful country of endless resources, capable of pastoral and agricultural adaptation, and equal to the wants of a large population, but that nothing has been done to develop its resources. The production of Sugar almost exclusively engages the people of every class; it has been the staple of the Colony and despite the European beet-root, I believe it will long continue to be so; but this fact should not interfere with or hinder the prosecution of other industries in Guiana. It is true that a fostering care must be bestowed upon the planting interest and every possible assistance given to procure the requisite labour at the lowest cost, but I maintain this can be done

simultaneously with the encouraging of other productions.

For some considerable period the savannah country of Brazil and Venezuela has given large returns from the enormous cattle ranches that are flourishing there, and from which to a certain extent you have been drawing your supply of animal food in place of producing from your own lands and deriving also at the same time a large revenue from the exportation of cattle to Europe in competition with the enormous trade now existing between England and the Western States of America and Canada, where cattle have to be driven two miles from their ranch to the Railway Depôt, and afterwards brought a distance of 5000 *not* 500 miles by Railway to Montreal for shipment.

Mr. EVERARD IM THURN thus describes the savannah land in an account which he gives of a journey into the interior. "Then suddenly the forest ended in a distinct line and the path passed out of its shades and on to the wide open savannah—and such a glorious savannah! It ran along the ridges of the mountains, down its slopes, over wide, well watered, and green plains, up on to other ranges of curiously terraced mountains, and on ever over mountain after mountain until it lost itself, to our eyes, in the blue misty distance. A most refreshing cool, almost cold, and strong wind, loaded with sweet wide gathered scents, hurried a few light clouds across the bright blue sky lighted by a glorious sun; and the shadows of these clouds racing over the mountains and the valleys and over the many well-wooded ravines, completed the intense and glorious beauty of the scene. From out of the long black prison of the gloomy forest, a step had brought us into the splendidly wide world

with its atmosphere of freedom and welcome promise of success."

My friend Mr. BARRINGTON BROWN, the well known Geologist who has just returned to England, refers to the savannah land in his geological work as follows:—

"The surface of the Eastern portion of the Colony, from the sources of the Corentyne and Essequibo rivers to the sea coast, may be regarded as a rough inclined plain, commencing at a height of above 800 feet above these and sloping down gradually to the sea level near the coast. Of this the most elevated portion is mountainous, but no part of it is elevated to a greater height than 2,000 feet above the sea, or 1200 feet above the river's level in the vicinity of the Essequibo, and 300 feet above the level of the source of the Corentyne. This plain extends Westward to the head of the Takutu river, and from that Northward to the base of the Canucu, Canucumu, and Coratamung mountains. Beyond this it spreads across from the Essequibo to the Cotinga river, coming up to the base of the Pacaraima mountains, where its general level is 300 feet above the sea. The Western portion of these two last named plains is devoid of large forest trees, and is covered with grass, being portions of the great savannah stretching Eastward from Brazil. The views from the savannahs have a beauty and singularity of their own, and it stirs one with a sense of boundless freedom to stand upon a knoll midst one, and view the grassy plain fading away to the horizon in the distance, and melting gradually, as it were into the atmosphere."

What minerals other than gold may be found in the grazing uplands of the savannahs, amidst the vast ranges

of mountains stretching onwards into the far interior, has yet to be discovered and I look forward to that not distant future, when this Colony shall prove itself by its population, its flourishing revenue, and importance, a worthy portion of our mighty empire.

That this fair land may make up for its dormant state in the past by its rapid development in the future should be the earnest wish and hope of all true colonists.

Let us now turn to the practical part of our subject.

I have previously stated that this is the most important question with which you can associate yourselves at present, and as a comparative stranger, I cannot help expressing astonishment at the apathy and lack of interest displayed both in private and public life respecting the matter. In other places, public meetings would have been held, duly presided over by your civic representative, supported by leading citizens, and every effort made to strengthen and support the hands of the executive, but it would appear that most people here look to the Government to do for them what elsewhere they do for themselves.

Several schemes have been advanced for opening up this country. One being by railway from the Demerara to the Essequibo to avoid the first fall on the latter named river—another being by a line of rails round the first falls of the Essequibo commencing at the lower end and terminating at the upper some eight miles in length. Now if there were no other falls and rapids on this or other rivers of the Colony, and it was intended that the Potaro district should be the limit of our extension towards the work of opening up the country, then such an arrange-

ment of transport might answer all purposes for conveying diggers and food-supplies to the placer-workings:—but so far as developing the resources of this Colony and the development of its agricultural, mineral and other treasures concerned, it would prove a waste of money, and delay the object we have in view and so very earnestly desire.

I do not presume to bring forward any formal proposal, but common sense would suggest that good roads are made before making railways, the one requiring per mile just ten times the cost of the other. Besides before making a railway it would be desirable to know what it was going to carry.

Referring again to South Africa, there towns have been built, districts settled, and extensive mines developed by the aid of the Ox and Mule waggon traversing roads over and through mountain ranges of 2000 feet in height and occupying from three to four months on the journey from the Railway terminus. The resources of the country being thus proved, railways are now being constructed to the Mining Centres, from every sea-port in the country.

(1.) I am of opinion that, as a commencement and for the purpose of getting into the interior, a well constructed road direct from Bartica to the savannah, a distance of 120 miles, would for the present supply every need, with branch roads to the several digging districts and waterside landings, thus leaving it optional to those who chose to use the long reach of the smooth water when desirable. With such a road, post carts and conveyances would be able to do the journey to the savannah in two days.

(2.) I would suggest that free grants of land be made to the first settlers in a selected district for a given period of time.

(3.) The establishment of a mining Town in the gold districts and centres of the Colony, by free grants to the first settlers.

(4.) The surveying of certain portions of the Colony and the laying out of lands for planting.

(5.) The sale of lands by easy instalments and long term of payment for the cultivation and extension of the fruit trade to large and small capitalists.

(6.) The giving of bonuses for the discovery of new mineral fields and to induce the production of new industries.

(7.) The publication of an Illustrated Pamphlet, setting forth the advantages of emigrating to this country, the route to pursue, and giving all possible information and particulars.

(8.) The establishment of an agency in London, to disseminate information and give the fullest data and assistance to those wishful to come to the country.

(9.) To wake up and induce the Royal Mail Steamship Company to follow the example of other Steamship Companies to grant a reduced rate of passage money, and to join us by taking an interest to advertise the Colony as a field for the industries, to those desirous of earning a competency and possession of a comfortable home.

The foregoing are among some of the plans I would suggest for the preliminary opening up of this country, and I have no fear as to this course achieving what we desire.

*Observations on Sea Defences.**

By P. van der Vlies.



ON my arrival in this Colony, in October 1888, the work as carried on, for defence against the encroachments of the ocean, was very defective.

In some places where fascine work was used it had been put down about $2\frac{1}{2}$ to 3 feet high, which is far too thick. The wash of the water, waves and currents being strong, made this fascine work, which was not sufficiently weighted down by stone, and the fagots of which were only loosely tied and packed one upon the other, work up and down, creating a hollow underneath; and the supports were thus drawn out of the earth and the work carried away by the tides.

In other places this fascine work was too thinly spread and open, giving the water a chance to play between, and thus the earth was washed away from under it.

In this sort of work the fagots must be very strongly tied and closely packed one against the other without any opening, and about a thickness of from 10 to 12 inches, with small spars across the whole and well secured, with posts driven in the ground and the whole then secured by galvanised or telegraph wire, and galvanised nails or spikes. All fascine work cannot be done without stone; very often from the want of stone all the work is washed away and money and labour lost.

* Contributed to the July meeting of the Society.—Ed.

Now let me give some hints how this can be improved on. The first thing should be to obtain a straight fore-shore by running out dams or groins of different lengths, the ends of which should form a straight line.

To do this work properly a facing of fagots, well and tightly packed together, weighed down with stone, is put down, for the purpose of retaining all the mud, &c., that is brought in by the tide. In time, this becomes solid land, perhaps not suitable for cultivation, but at any rate a safeguard to sea dams, or whatever else may be in danger of being washed away. It would be very beneficial to the Colony if, in 10 years time, we should gain as much land as we are now losing. Work substantially done from the outset costs very little to keep in proper repair. The strength of the waves and currents, is at all times, and in every place, to be observed, and the works built in proportion thereto.

It happens very often that sluices and kokers become undermined, so that the water passes underneath. This can be avoided by using fascine well faced with stone at both ends. So we see that stones and fagots, used as they should be, are a safeguard for this low sea-coast. I am much afraid that the proper way of doing the work will be considered too expensive. Work, in the way it is now done, is just like keeping a sick man from getting worse, without removing the origin of the disease.

From childhood I have been engaged in this kind of work, in places more endangered, with stronger tides and greater wash than occur on the coast of British Guiana. The observations I have made here are the result of twenty-nine years' practical experience.

*The Insolvency Ordinance, 1884.**

By E. A. V. Abraham.

HAVING been requested to give a few hints, or at least to point out some of the defects of the Insolvency Ordinance of 1884, I would ask leave to preface my remarks by saying that this law is taken nearly *verbatim et literatim* from the English Act, and that such wholesale legislation is not fitted for a colony like this, however it might suit the British Isles. We have several samples of these borrowed plumages from the English Acts, and I make bold to say that none of them have done their work with any good. The people in this colony are so mixed, and have so many different ways of doing business, that special legislation is required to suit the peculiarities of the colony, the peculiar way of trading, and the peculiar class of country traders.

Now let us for a little while look at some of the defects of the Ordinance under review. We are told that the "Court" means the Supreme Court of Civil Justice, and the full Court means the Supreme Court comprised of two or more Judges—mark you, not the Supreme Court of Civil Justice but the Supreme Court, and it may be the Supreme Criminal Court. Now as the Supreme Court is comprised of two or more Judges, and it is only in the Bail Court, which is a branch of the Supreme Court, where a Judge under the Manner of Procedure sits by special enactment as a Judge apart, it is difficult to know what Court is meant.

* Read at the August Meeting of the Society.—Ed.

This is bolstered up by the rules which enact that the Court includes a Judge when exercising the powers of the Court pursuant to these rules. Very much like the creole way of writing a letter and sending a message to explain the contents. No one understood what was for the full Court or for a Judge apart, and it was only as late as 1889 in HERBERT'S matter that the full Court decided what matters are to be brought before the Court. Under Section 26 an insolvent applies to the full Court for his discharge, and the Court grants his discharge—not the full Court ; and it was only in 1890, or 6 years after the ordinance, that it was decided that a Judge was to grant the discharge.

Elaborate enactments and rules are laid down as to what is an act of insolvency, and a debtor can evade all rules relating to his insolvency; and the creditor is without remedy unless he petitions against the debtor. He has a judgment against him, and he sends him an insolvency notice. The debtor does not care; he knows nothing can be done to him. On the day for hearing no appearance is put in on behalf of the debtor. It is ruled that he has committed an act of insolvency, and the creditor petitions and has to go over the whole ground again before the debtor is made insolvent, and before the month is up, JOHN CHINAMAN, RAMSAMMY, or SENHOR, who has his peculiar way of trading, makes away with all his property,—thanks to the long notice he has had,—and the creditor gets nothing.

Under section 19 the creditors at the first meeting or any adjournment may resolve that the debtor be made insolvent, or if they pass no resolution, or if a composition or scheme is not accepted within 14 days after the

conclusion of the examination, or if the creditors do not meet, the debtor may be adjudged an insolvent. Under rule 136, if no creditors attend the first meeting or any adjournment thereof, the debtor is to be adjudged an insolvent. Under the 1st Schedule, rule 24, if the creditors do not meet within half-an-hour from the time appointed, the meeting shall be adjourned. Under the ordinance you must adjudge the debtor insolvent, but taking the contradictions of the rules and Schedules, KIRKE, Acting Judge, in *MCGOWAN v DE FREITAS*, held this could not be done till after the adjournment, and ATKINSON, J., in *re CRAWFORD*, held that there must be an adjournment before the adjudication can be made if the creditors do not meet at the first meeting.

Under title "application for discharge" a debtor as one of the conditions of his discharge may be called on to confess judgment for the balance of his debts to be payable if he acquires property, etc., after his discharge. Yet we are told in Section 28 that the order of discharge releases the insolvent from all debts provable in insolvency. Under Section 43, a person holding a sentence for money lent to a debtor, say \$300, levies on the property of the debtor and bids up the property to \$300. The Provost Marshal calls on the creditor to pay up the \$300. He does so, expecting to get it back. Why! the law under section 43 invites the debtors to become a bankrupt within 14 days, and if he does, or if a creditor makes him one, the vigilant creditor loses his \$300 lent the debtor, and has to pay his \$300 to be divided amongst the creditors of the debtor.

Under Section 45 a person out of the Colony may make a settlement of his plantation or landed property

in the Colony, and although not recorded till after insolvency it is good as against creditors (*Winter v Templeton*). This settlement is good as against creditors, and I venture to state that serious complications will arise when this section is tested as we have it by the decision of the Privy Council that the only title to land in this colony is a transport or letters of decree (*Steele v Thompson*); and it is also laid down that property, the transport of which is in an insolvent's name at the date of his insolvency, although in the possession of a fully paid up purchaser, is the property of the insolvent and divisible among his creditors (*Brown v The Administrator General*).

Under Section 55, the Administrator General can bring, institute, or defend an action relating to the property of the insolvent. Section 9 states that no suit shall be commenced or continued after a receiving order unless with the leave of the Court. Now, although the Court can give such leave, no opposition can be entered to the passing of a transport by the Administrator General (Rule 181). Under the interpretation clause the Registrar means the Registrar of British Guiana, and includes a Sworn Clerk and Notary Public, and Assistant Sworn Clerk in the office of the Registrar. Under Section 365, the Registrar with the consent of the Governor may appoint any officer to perform his acts. A debtor, who owes \$5000, may apply for an administration order, and he is lucky if he gets it, as the Judges have repeatedly said that the amount has been fixed far too high. If the debtor is honest and by fair handling of his property may realise and pay his creditors in full, an irate creditor in the minority may apply to the Court for the Administra-

tor-General to take away his property, and by a forced sale make him bankrupt. A strange contrast if he is insolvent, for here the creditors in the minority have no voice.

I will give one case in illustration of the benefits of this section. A creditor owes \$2,000 ; he is ordered to pay at the rate of \$20 a month ; the costs of the suit against him come up to about \$320 ; the costs of the Administration Order about \$60 more. These costs have to be paid first. Now the creditors have to wait for fully 19 months before they can participate in the \$20 a month, and they cannot recover in a Court of law. This may seem a far-fetched case, but it is one of many. On presenting a petition, the petitioner is to deposit with the Administrator General \$24, but the Registrar is not to receive the petition unless a receipt for the \$25 is produced. Some paid \$49, others paid \$25, and the matter was referred to Mr. Acting Justice KIRKE, who was of opinion that the \$24 was a misprint for \$25, the Chief Justice holding that they were different sums. The different mode of payments continued till November 1889, when the Supreme Court decided that the debtor must make the payment of \$49. A debtor has to pay \$49 to the Administrator General, \$7 50 to the Registrar, and say \$100 to a lawyer—a good sum for an insolvent, and hence smaller dividends for creditors, and in one case \$1,500 was kept by the debtor for law costs.

Under the 219 Section a creditor who has judgment cannot, under the old law, imprison his debtor and get paid. He must first demand property. Of course none is given ; he then takes out a judgment-debtor summons, and lays over an affidavit that he does not know of any

property of the debtor. The debtor then comes up, and invariably he has nothing with which to pay. An order is made on him to pay \$10 a month; he pays a couple of months; then he does not. The creditor begins *ab initio*, and demands property again. The order is reduced to \$5 a month. He gets in default again. Proceedings *ab initio*, and then the creditor pays \$56 50 to make him a bankrupt and finds nothing to get. Under the old law he pays up rather than get a *fiat apprehensio* against him. Take another case. A debtor owes several parties sums of say \$500 each; he proposes to leave the colony, but is arrested *de fugæ*. He goes to gaol; the creditor goes to the expense of proving his case, filing claim and demand and proceeds to fiat. This latter is refused, because this part of the law is repealed and the other part left. The creditor loses his money and his costs, and the debtor walks out of gaol, bids his creditor good-bye, and leaves the colony by the first opportunity. Although the old insolvency law is repealed, yet it is in force under rule 263 "when no provision is made by the Ordinance or the rules."

Now we come to that bugbear, the judgment summons, and here I must refer to the abolition of imprisonment for debt. This abolition, although it may suit the keen susceptibilities of the English people, is one of the foulest blots on the law escutcheon of the colony. I defy any one to show me a single case where one of a certain class of debtors has paid under a sentence since the Act was passed. Under the old law the money put by for his children, or in his wife or friend's name was forthcoming to pay for him rather than see him go to gaol. The creditor goes through another expensive process and

the debtor is sick. Put him in the box and listen to his tale of woe : out of work, wife sick, children, father and mother to support ; sold all his property just before sentence to a creditor who resold it to the debtor's brother-in-law who placed the debtor in charge at \$15 a month, and he can't pay. The creditor is satisfied ; the Judge cannot make an order. Again the debtor has furniture worth \$700, according to his estimation, but he cannot pay instalments of Judge's order. Listen to his tale of woe ; wife to support and children ; all he got went for food ; tried to sell his furniture but could not get the price *he* wanted. The Court rules he is not bound to sacrifice his property, and refuses to commit him. The creditor is again satisfied. A debt is \$29 43, the debtor paid \$30, he still owes \$38 77. The debt is \$123, paid on account \$80, remain due \$155. These are some of the figures under the new law. Every body benefits except the creditors. These are some of the defects, not all, and if a new law is promulgated to suit the traders in this Colony, it will be hailed with delight by both creditors and debtors.

The Necessity of Pure Water for Health.

By E. D. Rowland, M.B., C.M., Edin.

IN a paper published in this Journal in December 1890, I divided "Foods" into three parts. 1. Air. 2. Water. 3. Foodstuffs proper. And as I devoted the whole of that contribution to the study of air from this point of view, I now propose to pass in review on a similar plan some of the principal points in connection with drinking water.

Now as certainly as pure air is the first food condition of the environment required by the human body to maintain it in health, so that it may perform all its duties to the best advantage, so certainly is pure water the second. By observation under many varied conditions it has been demonstrated that man dies in about three days with acute delirium if deprived of water. All organic life as we know it on this globe requires water for its continuance. The human body consists of 58.5 per cent of water, or a little more than half the body weight. All the chemical changes of the body are carried on in a watery medium and all the cells of the various tissues live in water. The foods for the growing and working cells of the body are carried to them by means of watery media, blood and lymph, and all the effete matter is washed away by the same agents.

Water is composed of two elements, oxygen and hydrogen, combined in the proportion of two molecules of hydrogen to one of oxygen to form a molecule of water. It is a definite chemical compound and not

merely an admixture as we saw was the case with the constituents of the air. The two elements are combined in the definite proportion stated above to form one fairly stable body, water. All the other bodies found in it on analysis being merely dissolved in it and not being in any proper sense combined with it.

The great reservoir for water, the source from which it comes and the place to which it returns sooner or later after longer or shorter journeys, is the sea. And here we again come on a perpetual circle of change similar to what we found existed in regards to the oxygen of the air. There we saw that the body took oxygen directly from the air and that sooner or later combined or uncombined oxygen was given back to the air to go through the same or similar changes again. The process is a little more complicated in the case of water but is the same in principle. We may here note that there is a gradual rise in complexity not only in the fact of water being a compound and not a simple element but as well in the mode of its reaching the body and so on. This gradual rise in the complexity of the process perhaps will be better seen when we come to deal in the future with food stuffs proper. From the sea under the influence of the sun's heat the water rises into the air invisibly for the most part leaving behind all impurities. This invisible vapour is contained everywhere in the atmosphere, and the terms dry and moist climates connote the relative proportion of water suspended in the air. As this invisible vapour rises into the higher strata of the atmosphere where the temperature is lower than at the ordinary level of the earth it condenses; it becomes by a relative approximation (?) of its molecules visible in the

form of clouds or "water dust" as Professor TYNDALL calls it. These clouds, which vary in form under their own laws, and of which a definite classification was made as long ago as 1802, by Mr. LUKE HOWARD, are at the mercy of the winds, ultimately being blown into still colder strata, such as exist over mountains and tall trees, where the particles of water are still more condensed, and so, becoming too heavy to be supported by the air, fall as rain. Should the cold be excessive we have a solidification of the water taking place into definite and beautiful shaped crystals, named at the earth's surface snow; but should these strata of excessive cold be met with by the rain in the course of its fall to the earth, hail is formed. In our low-lying tropical country snow is never seen and hail is a phenomenon. The whole experiment of the evaporation of water from the sea and its return to the earth as rain can be displayed on a small scale as follows. A small flask with some water in it is set over a spirit lamp, which here plays the part of the sun. The water slowly begins to boil and gradually steam, *i.e.*, vaporised water, issues from the nozzle and only becomes visible at a short distance from the point as a cloud. If now a cold substance such for instance as a plate of glass be held anywhere in the artificially produced cloud, water at once is precipitated on the surface and runs off in drops, *i. e.* rain. This is the process that is always going on in the world. It never ceases; there is one perpetual circulation.

The rain falling on the hill side runs downwards as streams in the open spaces. If the ground is loose and permeable it sinks into varying depths until it reaches an impermeable stratum along whose surface it runs until

it comes out in the open, lower down the hill side, forming a spring, or until some new arrangement of the impermeable stratum forces the water to the surface. This spring probably flows into the streams I have mentioned as forming in the open, and together with other streams form rivers which after longer or shorter courses find their way into the sea. There is in this circulation a striking resemblance to the process pointed out in my last paper as going on with the oxygen of the air. The water exists as sea, it is vaporised by the sun's heat and falls on the earth's surface as rain, it is collected from this directly or indirectly from streams and springs, used by man and rendered impure, then returned to the earth to find its way into streams again and ultimately to the sea, where it is purified and again becomes fit for human use.

In this colony, where for geological reasons there are no natural springs in the inhabited parts, and where the river waters are, at all events in their lower reaches, rendered unfit for human consumption by the presence of salt water, the drinking water is collected from the roofs of houses and large buildings as churches, and is stored by private persons and municipal bodies. This is the source of water for household use for the wealthy, and is of good quality, and only requires to be kept so that the tanks should be looked after and the guttering kept clean. In the wet weather the poor people have the same good water supply if they will only keep a bucket or two under the corner of the eaves of their houses, but in the dry weather in the towns they have to use the water brought by the Corporations from "creeks" some distance inland and above the

influence of the tide. For Georgetown the Lamaha is the source, and for New Amsterdam the Calabash, a small tributary of the Canje Creek, some fifteen miles or so from the town. The villagers in the dry season use for the most part the ordinary trench water which is nearly similar I believe to the water found in the open trenches of the towns.

Let us take these three waters in some detail ; and to guide us aright in our study I here quote Professor PARKES' definition of good potable water. The Professor says " Pure and wholesome water should be " transparent, sparkling, and well ærated. No suspended " matter should be detected by the naked eye. It " should be palatable, without color, and have no smell. " Containing less than eight grains per gallon of " dissolved solids, under one grain of volable solids and " not more than one grain of chlorine. There should be " no nitrates or nitrites. The free ammonia less than " .0056 grains per gallon. It should not have more than " two degrees of fixed hardness. There should be no " metallic contaminations, and the microscope should " show few vegetable forms and no low forms of animal " life, though large fish and some low vegetable forms " are permissible. There should be no organic debris." When all these conditions are fulfilled we have a good pure water, and though on reading them it may seem somewhat alarming and well nigh impossible to reach this standard, yet this is not really so, for with a little care in the collection and storage of rain water in this country we get a water that complies well with all Professor PARKES' demands. And further some deviation can in some particulars be made without the water

becoming dangerous. For example, the degree of hardness may be made higher, and the amount of dissolved solids may be increased without much risk, but at the same time there are certain matters that must on no account be increased, such as albuminoid ammonia and organic matter.

Now having this standard before us we can proceed with our study of the water we have to drink in this Colony.

The rain water collected from the roofs. This is a good water second only to distilled water, and if care be taken to keep the vats clean and to let the first rain falling after many days of dry weather run away, it will comply with all the requirements of our standard as quoted from PARKES. Falling as this rain does here through a comparatively smokeless atmosphere it contains very little solid or other foreign matters. As a rule only some dust, traces of ammonia, nitric acid and chloride of sodium, and in the tanks some fresh water diatoms and bacilli. These two last being low forms of vegetable life, the amount of which will vary in proportion to the care given to keeping the vats clean. In the dry season when the vats are becoming empty, a few mosquito larvæ are often to be found. These live in water for a short time and greedily devour all organic matter, hence they are almost to be considered beneficial. All that is required to keep this rain water pure and good is a little care; the guttering and pipes should be inspected from time to time, and leaves not allowed to gather in them; bird and insect nests must be removed; and as stated above, the first showers after a period of dry weather should not be allowed to run into the vat. There are

patented separators for this purpose. In this country with little or no smoke in the atmosphere, rain water collected directly is clear and sparkling, while, in manufacturing towns and countries, it is dark colored and has a nasty disagreeable taste of smoke.

The vats and tanks require to be cleaned from time to time ; they should be provided with a roof to protect the water from leaves and so on, and the taps should be some distance from the floor so that any deposit that may collect will not be disturbed at each drawing of water. By attention to these few details good water can always be obtained in this colony, and hence one welcomes the erection of large tanks by the governing bodies of our towns which allows the poorer people to get more and more pure water during the dry season. Mr. LUKE HILL in a paper published in *The West Indian Quarterly* of 1888, states that no less than \$70,000 had been spent by the Georgetown Corporation and the Government in erecting tanks since 1860. For this sum eighteen tanks have been built ; they have a storage capacity of 870,000 gallons and the water is sold at half a cent a gallon. In New Amsterdam there are seven public tanks with a storage of 175,000 gallons. Authorities advise that stored water should be filtered, or, even better, boiled before being used, but though there are many cheap and good filters to be purchased, and although boiling water is not a difficult operation, it would seem that the most of us prefer to risk something and take our water unfiltered and unboiled. The old-fashioned drip stone makes a good filter. On the whole it would seem that rain water stored with the care I have mentioned above may be taken without further precaution and with little

or no risk of producing disease ; but for the other waters of this colony this cannot be said.

In the paper of Mr. LUKE HILL, and in the British Guiana Asylum Journal, there will be found estimates of the amount of water that can be collected in this colony annually. Mr. LUKE HILL, taking 90 inches as the annual rainfall of Georgetown, gives the total quantity of water falling every year in the municipal area of the town with 50,000 inhabitants as 2,050,000,000 gallons. Hence all that is required to give every one a good drinking water is that each house should be finished with a tank.

The amount that can be collected annually from varying sized roofs is shown in the following table some of the figures for which I borrow from the article of Mr. LUKE HILL previously mentioned.

60 feet by 40 feet, 125,000 gallons per Annum.

50	„	35	„	91,000	„	„
45	„	30	„	70,000	„	„
40	„	25	„	52,000	„	„
35	„	20	„	36,500	„	„
25	„	15	„	18,500	„	„

These figures are sufficient to show that the difficulty does not arise from want of rain but rather from the original cost of tanks, and storage, and it would seem that in this matter private individuals are content to throw their responsibility on to the shoulders of municipal bodies. And these bodies for various reasons, in which as usual financial ones play a prominent part, have given a fairly cheap water to the towns though its quality in some points is open to grave criticism.

The Creek Water brought to Town by the Corporation.
For Georgetown an artificial canal dug many years

ago and called the Lamaha, furnishes the water, and for New Amsterdam a small canal brings water from a small tributary in the Canje creek. These waters are for practical purposes similar. They are taken from the natural drainage of the savannah, a flat area of country lying immediately behind the belt of cultivation that fringes the coast of British Guiana. The upper layer of this flat country, on which grow various grasses and shrubs but few or no trees, is composed of peaty matter, the so-called pegass, and decomposing vegetable debris; below this is a layer of the ordinary clay of the country. The water of these creeks is of the color of weak tea or coffee, and has a faint unpleasant fresh fishy odour even at ordinary temperatures, and in small bulk and when freshly drawn in large quantities is often offensive. It has a sweet, somewhat astringent taste, and contains large particles of matter which are clearly visible to the naked eye and which in a few hours, if the water is placed in a tall glass and set aside, form a deposit of some depth. Mr. E. E. H. FRANCIS the late analytical chemist of the colony, devoted some considerable time to the study of this water, and it is from his paper in *Timehri* of December 1883, that I take much of the analysis and chemistry that I am now about to give. Mr. FRANCIS states that the colour is due to the presence of humus bodies, *i.e.* a series of bodies that result from the decomposition of vegetable mould—the principal one being a brown body which may be separated out by standing some water in a glass vessel exposed to light for months. When this is done a clear water results,—the solid suspended matters have fallen to the bottom as well as the humus bodies. This body or rather series of bodies is

present in creek water to the extent of 4·653 grains per gallon. It is very difficult to remove. All sorts of materials have been tried as filters without success, and the galvanic action of metals has also failed. By experience our local laundresses have found that the addition of a small amount of alum to the water clears it up to some extent by forming an insoluble compound with the humus bodies. Mr. FRANCIS gives the following as the result of several carefully made analyses of Lamaha water.

Vegetable and organic Matter	...	...	...	4·653	grains per gallon
Iron Peroxide	...	...	...	·701	" "
Alumina	...	...	...	·230	" "
Lime	...	...	...	·050	" "
Magnesia	...	...	...	·133	" "
Potash	...	...	...	·116	" "
Soda	...	...	...	·965	" "
Silica	...	...	...	·500	" "
Sulphuric Acid	...	...	...	·432	" "
Chlorine	...	...	...	·371	" "
Total	...	...	...	8·151	" "
Degree of Hardness by Clark's Standard 4 deg.					

Now comparing this with our definition we find creek water to be defective in many ways. It is not quite transparent, it contains visible suspended matter, it is not palatable, and when freshly drawn has an odour. There are more metals than are allowed, amounting to no less than 2·786 grains per gall. of which ·701 gr. is iron; it has just over the 8 grains of allowable solids, less than one grain of volatile solids, less than a grain of chloride. There are no nitrates or nitrites, but it is harder by two degrees than is allowable, and is full of lower forms of animal and vegetable life as well as vegetable organic debris. So that in the face of this analysis one would not hesitate to condemn the water as unfit for human

consumption ; but on the other hand there is the practical experience of the two towns to be set against such wholesale condemnation, and to this I shall return later on.

In working at the subject, after many trials of various substances, Mr. FRANCIS found that theso-called Alumino-ferric cake and ordinary slaked lime, added separately to the water, formed insoluble compounds with the humus bodies, readily precipitated, from which clear water could be decanted ; and he devised a simple method of working which I think has not received the attention it deserved.

The following figures show the change produced in the water.

<i>Before.</i>				<i>After.</i>	
Vegetable organic Matter...	...	4'653	grs. per gall...	...	1'512
Iron Peroxide	...	...	...	...	...
Alumina	...	...	...	...	...
Lime	...	...	...	...	...
Magnesia	...	...	...	...	...
Potash	...	...	...	...	...
Soda	...	...	...	...	...
Silica	...	...	...	...	...
Sulphuric Acid	...	...	...	...	...
Chlorine	...	...	...	...	...
Total	...	...	8'151	...	11'243
Degree of Hardness	...	...	4 deg.	...	5'7 deg.

Now comparing this purified water with our standard we find that it comes much nearer to it than it previously did. We find that the process has removed nearly all the organic matter and all organic debris, and that it has increased the total amount of solids, no less than 2 grains per gallon of lime being added, and that the degree of hardness has been raised. On the whole there has been a decided gain, for the loss of 3 grains of organic matter far out weighs the addition of the lime. If Mr. FRANCIS'S process could be adopted by our corporations

on a large scale, our town's people at least would have little to complain of in the way of water. I am informed that Mr. FRANCIS'S process is adopted in Georgetown in prolonged drought when the public tanks become empty. It has the merit of being fairly simple and of not costing much. In his paper he gives an estimate of \$5 50 as the cost of material necessary to purify 300,000 gallons of water. To this would have to be added the cost of labour, but as will be seen from the following description of Mr. FRANCIS'S plan this could not be much. I quote the late chemist's words. :

“ The water from the canal is to be conducted to the
“ filter beds (he is speaking of the beds at the George-
“ town Water Works), along a channel which may have
“ to be about 100 feet long and 6 to 8 feet wide. In
“ the first part of this channel an open wooden box,
“ liberally perforated with holes, is to be suspended by
“ a contrivance which will admit of its being raised or
“ lowered to any required height. A few slabs of
“ alumino-ferrie cake being placed in the box, the latter
“ is to be lowered into the channel to such an extent, that
“ the water passing through at a uniform velocity
“ will dissolve exactly the proper quantity of the cake.
“ As the substance dissolves slowly and regularly this
“ can be managed quite easily after a few trials. Along
“ the remainder of the channel a few hogsheads of
“ Bristol lime are to be distributed so as to form a bed
“ of slaked lime over which the water flows. If the
“ current is not too rapid, no mechanical disturbance of
“ the lime will take place ; but if the length is properly
“ proportioned, the water will take up the exact quantity
“ of lime necessary to set free the alumina and colouring

“ matter. The water holding these impurities in suspension then proceeding to the filter-beds will pass through colorless and clear, leaving the impurities as a brown sediment on the surface of the sand. When this process is once set going, it should require little attention. Fresh alumino-ferric cake must of course be placed in the box as the other dissolves, and the bed of lime will occasionally require renewal. As the impurities accumulate on the filter beds, the sand will become clogged ; but as the sediment is very light and remains almost wholly at the surface, it can be easily removed. Simple flushing with water, which is then allowed to run to waste is sufficient for this purpose. As the Water Works (in Georgetown) are already provided with two filter beds, each of adequate dimensions to filter the town supply, they can be used and cleaned alternately. A piece of ordinary test paper held in the water passing from the purifying channel serves as a useful guide to the proper working of the process. If the water is alkaline, too much lime is passing into solution, and if very acid too much alumino-ferric cake. When the proper quantities are present the water slightly reddens violet litmus paper after flowing over it for a few minutes.”

As far as I am aware this is the best process that has yet been suggested for the purification of the creek water of our towns and I cannot understand why it has not been adopted. It is merely playing with the thing to be constantly sending samples of water to analytical chemists in England who so often regret that so many bottles of samples were broken on the journey that a reliable report cannot be made.

The Ordinary Trench Water, the Water Supply of the Villages. This water is ordinary drainage water on its way to the sea. It is creek water more deeply contaminated. It frequently is brackish owing to the "sluice or koker door," failing to shut out the rising tide. It contains all sorts of abominations, ordinary washing from the road, the drainage from grave yards, house yards, latrines and so on. And in many villages where these last are few and excrement of all sorts is simply thrown out of the cottage window or door, the water is abominable. The stock of the villagers, cows, horses, donkey and pigs, drink from it. Children are bathed in it. Clothes are washed in it. Fish for dinner are caught from it and coolies perform their particular ablutions in it. Finally the villager drinks it with frequently disastrous results that no one is surprised at perhaps but himself.

Under such circumstances one knows that the water cannot be good. It has a taste, an odour, and contains solid particles suspended in it. It has all the defects of creek water with faecal contamination added. There are multitudes of low forms of animal life, and ova of parasites. It contains the *bête noire* of sanitarians, effete organic matter in the form of the albuminoid ammonia, nitrates and nitrites; and hence should not be used for human food.

Finally we may conclude of the three waters of the colony, that the rain water, if care be taken in the storage is good; that the creek water as delivered by the pipe service is not free from danger but that by the use of a simple process might easily be rendered so; and that the trench water must be condemned as unfit for human consumption.

The quantity of liquid required by an individual is

from 60 to 90 ozs. per diem for drinking. It varies somewhat with the work done and the temperature of the surrounding medium. For other purposes the individual requires more. Put in a tabular form the amount may be stated as follows :

For General Domestic Use	...	...	12 gallons per diem.
„ Bath	...	...	10 „ „
„ Waste	...	...	3 „ „
„ Animals in Towns	...	...	10 „ „
„ Trade Purposes	...	...	5 „ „

—
40 gallons.

And further a generous allowance is required for street watering and fires.

The English soldier is allowed fifteen gallons of water per diem. In Calcutta, Europeans are allowed thirty gallons per diem and natives fifteen. Glasgow allows its citizens fifty and New York three hundred, while those of Norwich have an allowance of only twelve gallons.

The Georgetown Water Works deliver from 500,000 to 750,000 gallons per day according to the season, this gives from 10 to 15 gallons per head, taking the population in round numbers as 50,000. There are few fires and a not very extensive system of street watering; few or no factories, but a number of horses and cows; so that each individual can get very nearly all the quantity allowed. And further the public and private rain water tanks are not in this calculation taken into account for they form an unknown quantity. It is sufficient at all events to allow all the wealthier classes to have rain water for cooking and drinking purposes, in almost the whole of the driest of dry seasons. The rain water bath has sometimes to be discontinued. So that as to quantity Georgetown is fairly well supplied. In

New Amsterdam the supply is not nearly so good, there the Water Works deliver only 6,000 gallons per day which gives 7 gallons to each individual only. Fires are rare and the street watering is limited, but the private and public tanks are not numerous. The water supply for this town is capable therefore of improvement in the matter of quantity as well as in quality. A minimum of 10 gallons per head ought not to be an insurmountable difficulty to the New Corporation. New Amsterdam has some three artesian wells, which yield an unmeasured and continuous supply of good water, freely used by those who live near by.

The diseases produced by bad drinking water are many and varied, and it will be sufficient for me just to mention a few of the most important. And here, similarly as was shown when speaking of pure air, it is the effete organic matter that would appear to be the dangerous element. In water chemists have given it the definite name of Albuminoid Ammonia, and a trace of this or of nitrates or nitrites, which is only a further stage of the decomposition of organic matter, is sufficient to indicate that it is unfit for human food. It has been found that water containing animal organic matter in this form gives rise to bowel disorders, to severe and fatal diarrhoeas, and there is strong evidence to show that it is only in such waters that the bacilli of enteric fever, dysentery and cholera are to be found. These bacilli are for instance never found in good spring water coming from a depth in the earth and kept free from sewage contamination. In this matter it is important to remember that these diseases are specific in character and arise and only arise from their definite bacilli. The evidence at present is that

enteric fever can only come from enteric fever bacilli in the same manner as only oaks can grow from acorns. And statements that are so frequently made, that certain outbreaks of dysentery have been caused by eating trench fish, bad rice and so on, can only be viewed as the wild explanations due to want of knowledge. The most that can be admitted is that bad foods such as mentioned above may predispose the body to an attack of a certain specific disease, *i.e.*, reduce the body to a less resisting condition. We are only now just beginning to recognise how teeming with bacilli, the surface of the earth is, and how wide the distribution of the same species may be. So much so that I venture to think that the future may show us that the bacillus of dysentery is as widely spread as that of tetanus. Cholera and enteric fever are also spread by water, and the late Dr. FINLAYSON has told me of his experience of the epidemic of 1854 in the colony, which viewed by the light of later knowledge goes to show that when cholera was raging in a near village, a man would go over to see one of his friends in it, drink some water and come back to die in his own home, in a few hours perhaps. The various refuse, excreta and so on, was thrown out of window and soon reached the trench. The villagers drank of this water and in a day or so sickness and death occurred in house after house in the village. In this sort of way the disease spread over the whole colony and the older inhabitants can testify to the terrible suffering and mortality. Dysentery spreads in this manner, and I have heard of cases of this disorder being brought from the gold placers and spreading through a village on the East Coast of Demerara. In the literature on the subject there is an overwhelming

mass of data on this point which can leave no shadow of doubt in the mind of the reader. There is no mysterious spread of a disease; if we fail to trace the source, it is because we have missed some point and never because of occult influences. Yellow fever is another disease whose spread there is some evidence to show is at times by water. Malarial diseases are, it has long been held, produced by marshy waters, and the old Greek physicians affirmed that people who drank certain waters developed large spleens and were subject to agues. Latterly under the influence of French physicians, the spread of malaria by water has ceased to be so strongly held, and by some authorities is even denied.

Intestinal parasites are conveyed to the human being in most cases by water. A fairly full description of the commonest of these will be found in Vol. iv. Part ii. (New Series) of *Timehri*, written by Dr. OZZARD, and the wide distribution of these worms can be readily grasped when one hears that there are 64,000,000 eggs in every mature female *Ascaris*. It is quite sufficient for one of these to reach a trench in this colony in order to infect every person who drinks of that water.

One form at all events of the so-called "Barbados leg" is due to a parasite which gets access to the body by drinking water.

There are other diseases due to water, but for us here, diarrhœas, dysenteries and intestinal parasites are the important ones. The two first take a high place in the list of causes of death in the colony. The parasites act more indirectly and do not figure as causes of death frequently. Diarrhœas and dysenteries cause about 15 per cent of the death-rate of the whole colony, which

is quite sufficient to ask that the cause of such preventable diseases be removed. For the towns this might be done easily by the adoption of Mr. FRANCIS'S plan of purification, though we know from experience that if this water coming direct from the creek be kept free from sewage and other contamination, full of vegetable organic matter as it is, it seldom produces disease. I have seen patients at the Asylum drink this water with impunity at the stand-pipes in the grounds. Good rain water was always given them at meals, and they were given buckets of the same good water to take to the fields to drink, but they would drink the creek water from time to time. And in one long dry season that occurred while I was Assistant Medical Officer there, doctors, patients and every one had to drink this water, for the vats were empty. A little alum was added to a bulk of creek water and then allowed to settle, the upper clear layers were decanted off and used for drinking purposes. It was neither boiled nor filtered. The patients, attendants, and myself drank the water for some weeks without any one of us experiencing any bad effects. Hence I repeat that creek water if kept free of sewage, loaded though it be with vegetable organic matter, is not so dangerous to health as might be supposed from the result of its chemical analysis; and if it were purified as indicated above, it could be classed as a usable water. In order to induce the town's people to use the pipe water, the emptying of the wide trenches might be tried. It would doubtless not be pretty to have large open empty trenches in the town, but the people would draw water directly from the pipes, free from the ova of parasites and sewage, with considerable benefit to their general well being.

The villages for the most of the colony are too isolated and the houses in them too scattered for any large scheme of water supply to be practicable, but village authorities might encourage the building of large tanks near to the churches, and the inhabitants might be taught the dangers of drinking bad water ; so that for self protection they might be induced to attempt something in the way of water storing.

The importance of the subject and the fact that light is only now being thrown on it by continental workers, will be sufficient reason for my drawing attention to the - distribution of bacilli in water. The following principles are I think generally established in this matter. The habitat of bacilli generally is the surface of the earth, wherever there is organic matter either vegetable or animal. They are fewer, comparatively only, in the country than in the towns, and the most of the specific organisms, that is those that produce a definite disease in man or some of the lower animals, are found more or less close to his habitations. From this wide source some bacilli rise into the air with particles of dust, this depending on the amount of water in the superficial layers of the soil. Many of these are washed back to the earth by showers of rain, and if this water be collected directly some bacilli will always be found. They vary in number very much from various obvious causes. More bacilli will be found in water that has fallen in a town for instance, and more will be found in the water collected at the beginning of a wet day than in that collected at the end of the rain. These bacilli are held in the water in the superficial strata of the earth, and if this water is drained off and collected, it will be found to

be crowded with bacilli and spores washed from the earth. But as I have stated above if the water sinks to any depth, it is filtered, and bacilli are not found in springs coming from any depth of the earth. The specific nature of each bacillus is more and more becoming evident. The bacillus of tetanus for instance, which has been found in the earth almost all over the world is always the same and always produces tetanus. So that the statement that specific diseases are always produced by the same specific germ is more and more becoming established. We are often unable to trace the spread of the bacillus but this is from defect in our method. Hence it is not sufficient to know that such and such water contains so many millions or hundreds of bacteria per cubic centimetre in order to be able to forbid its use, it is necessary to know if it contains any specific organism. If this can be affirmed for instance as KOCH was able to do of certain tank water in India, which he found contained the comma bacillus of cholera, then at once and without hesitation one can say that the water must not be used. Similarly some French observers have demonstrated the presence of the enteric fever bacillus in the water of the Seine and have traced the spread of an epidemic of this disease to the house supplied with water from this source. FOSBROKE in the Sanitary Record of 1882, showed that an epidemic of enteric fever at Evesham was due to the specific bacilli in ice. The bacilli of anthrax have been found to live in water for over 100 days. And so on through page after page of modern medical records. Ordinary rain water contains numerous forms of bacilli, there are some eight or nine well-known differentiated forms, but the human body is able to destroy apparently



all of these, and it is only when a so-called specific germ is brought into relation with the body, the latter possibly having to be in a certain state, that disease is produced. Day by day we are learning more and more about micro-parasites, and learning as well that though surrounded by these formidable pigmies, yet with care and without scoffing we can, thanks to the continual energy with which certain of our body cells devour bacilli, walk the earth for a short space in comparative safety.



The Foundation of the French Power in the West Indies—1625–1664.

(Translated by Mrs. George Dawson, from "*Les Navigateurs Français*,"
by Léon Guérin ; annotated by N. Darnell Davis.)

THE French had long been sailing in the West Indian seas. The waters which wash the West Indian Islands, and those of the Gulf of Mexico, had been the scene of many of their sea-fights, in which they ran down and captured some Spanish Galleons ; and three quarters of a century before, in 1550, forty Frenchmen, led by a brave man named ROUSSELAN, had begun to colonize the Island of St. Lucia ; but it was afterwards abandoned by them, and they then endeavoured to settle more firmly in some of the other West Indian Islands. Therefore it is not so much with reference to "navigation," as to "colonization," that we shall here sketch the story of the first French enterprises, the effect of which must always remain stamped on the West Indies.

A gentleman of Normandy (for wherever there was any distant and chivalrous enterprise to be undertaken, we find a descendant of the men who conquered England and the two Sicilies, both in the islands of America and in those of Africa, as well as in the West Indies, and the Canaries), a gentleman of Normandy, I say, named DE VAUDROCQUES—DIEL D'ENAMBUC, a younger son of his family,* was obliged to seek his fortune at the

* The writer, as have many others, mixes up d'Enambuc's name with that of Vaudroques. The hero of the narrative was Pierre Belain Sieur d'Enambuc, son of Nicolas Belain, Sieur d'Enambuc et Canou-

point of his sword, according to the law of that time ;— he became a seaman, and, we may presume, a privateer. He made himself famous by many deeds of war, and was summoned to join the service of the King as a Captain stationed in the seas of Ponant.* But this could not satisfy his longing to make the French flag famous by distinguishing himself in the career of daring adventures on which he had entered, nor the noble ambition which he felt to raise himself to the same position as that which his eldest brother held by the chance of birth.† He joined another Captain named “DU-ROSSY,” fitted out a brigantine, carrying four cannons and some swivel-guns, and hired thirty or forty soldiers who were well used to fighting, and well disciplined, to seek their fortunes with him ; and whilst other Frenchmen were perseveringly turning their attention to North America, D’ENAMBUC sailed from Dieppe in 1625 for the West Indies, not so much with the intention of settling there at once, as in the hope of carrying off some rich prize from the enemy. But as soon as he arrived near the Cayman islands, between Cuba and Jamaica, he was sighted, and instantly attacked by a Spanish Galleon of 400 tons, and 35 pieces of cannon. The first shock was terrible for the poor little brigantine, which might have been crushed by the mere weight of its adversary. However, recovering from

ville, in sunny Normandy. Pierre's sister, Adrienne, married Pierre Dyel, Sieur de Vaudroques, and their sons are the du Parquets mentioned afterwards. See *Belin d'Enambuc et les Normands aux Antilles*, by *Pierre Margry*. Paris, 1863.—*N. D. D.*

* The Marine of the *Ponant*, sailed on the high seas, as distinguished from the Marine of the Mediterranean.—*N. D. D.*

† d'Enambuc's elder brother, François, became Sieur de Canouville.—*N. D. D.*

the first moment of surprise, he took advantage of the lightness of his vessel to avoid the heavy broadsides of the galleon as much as possible, and he soon flew round the great ship, and harassed it on all sides ; determined to sink, rather than to run away. Though his sails hung in rags ; though his cordage was all broken, and though ten out of his crew of forty men were killed, and almost all the rest disabled, her intrepid Captain D'ENAMBUC did not show the slightest intention of yielding : on the contrary, he attacked the enemy from stem to stern, and did her considerable damage. At the end of three hours of desperate fighting the victorious brigantine compelled the galleon to let her go on her own way. After this triumph, which had cost the Spaniard half of his best soldiers, D'ENAMBUC hastily repaired his brigantine, which had been almost shivered to pieces, just to enable him to reach some port and to put her into safety from the attack of a fresh enemy until he should be able to put her into thorough repair, and until his wounded men should be in a condition to go to sea again. With this object, he sailed for the Island of St. Kitts (which CHRISTOPHER COLUMBUS had formerly honoured by his name), and after fifteen days' sailing he cast anchor there. At St. Kitts D'ENAMBUC found several Frenchmen, who had taken refuge there at different times, and from different reasons—and they were living on good terms with the Carib or Cannibals who then inhabited part of the West Indies—and these Frenchmen gave him the idea of settling a French colony in that island.*

By chance, two rival nations of Europe first planted

* There were but two or three shipwrecked Frenchmen on the Island. These were found there when the English made their settlement, about two years before the arrival of d'Enambuc.—*N. D. D.*

their feet, on the same day, on the same West Indian Island; for whilst D'ENAMBUC was landing on one side of St. Kitts, the English Captain WAERNARD was landing on the other side, after having first been also roughly handled by the Spaniards.*

For several days, French, English and Caribs seemed to get on well together. The Indians were the first to break the peace. Their "boyez" or "medicine-men" had persuaded them that the strange men had come so far only to massacre them, so they resolved at a general meeting, to get rid of them by all means, and they sent word to all their allies outside the island to meet them at the next full moon. But one of the Carib women revealed this plot to a Frenchman, and the Europeans of both nations determined to prevent its execution. On the same night they suddenly attacked the Caribs in their hammocks, and slew them to the number of a hundred or a hundred and twenty.† After this slaughter the French and English arranged themselves to receive the Indians who were coming from other parts, by retrenching themselves, and laying ambushes on the approaches to their fort. Three or four thousand Caribs arrived at St. Kitts, at the full moon, in large canoes; the colonists allowed some

* This is an oft-repeated error. Warner and the English had settled at St. Kitts about two years before the French came.—*N. D. D.*

† The narrative is again in error. The English determined to be beforehand with the Caribs, who contemplated their destruction. The Caribs were slaughtered. This took place before the arrival of the French. When d'Enambuc came, the English were expecting an avenging visit from the Caribs of the neighbouring islands. Warner offered to share St. Kitts with d'Enambuc, to secure his help against the Caribs. Hence the division of St. Kitts between the French and English Nations. See *Egerton M.S., No. 2,395*. John Hilton's account of the Settlement of St. Kitts and Nevis.—*N. D. D.*

of them to land, and then discharged their guns at them, knocked them over, and drove them back to their canoes. The savages fought bravely as they were driven back, discharging a multitude of poisoned arrows by which about a hundred Europeans were killed. But their defeat was none the less complete, and their destruction gave security for a time to the French and English. After this victory over the Caribs D'ENAMBUC and WAERNARD discussed the plans which they had each formed separately with their own people to settle permanently at St. Kitts, and they began to make an agreement about the dividing of the island. They both wanted to go and get support in Europe and to arrange at their respective Courts the Acts of taking possession of their respective divisions of the island. So they left on the same day, D'ENAMBUC with DU ROSSEY for FRANCE, and WAERNARD for England—leaving at St. Kitts part of their countrymen, and swearing that they would return to live or die with them.*

D'ENAMBUC took to France a rich cargo of Tobacco and other West Indian produce, which he sold at a high price. He well knew that men are often influenced by appearances, so he used the money gained by the sale of his cargo to procure a splendid equipage, in which he went to Paris, and which induced many to wish to follow his fortunes. He obtained an interview with RICHELIEU, who encouraged all enterprises which were maritime and which led men to establish colonies, and D'ENAMBUC won him over to look favourably on his design of settling in the West Indies.

* The Waernard mentioned is Sir Thomas Warner, whose descendants dwell in the West Indies, to the present day.—*N. D. D.*

On the 31st of October 1626, a deed of agreement was signed in the Cardinal's palace to send out colonists to the West Indies under the Captains D'ENAMBUC and DU ROSSEY, and to settle inhabitants in St. Kitts, and the other islands, which were not already occupied by Christian princes, from the 11th to the 18th degree of the equinoctial line. RICHELIEU entered into this "Company" contributing £10,000—£2,000 in money, and £8,000 in a ship; Marshal D'EFFRAT, Chancellor of the Exchequer, contributed £2,000, and SIEURS DE FLESSELLES, DE GUENEGUAD, and several others each contributed £2,000. The same day a commission was presented to D'ENAMBUC and to DU ROSSEY authorizing them to establish a French Colony at St. Kitts, or in any other island they might choose. D'ENAMBUC immediately went to Havre-de-Grâce to fit out his vessel called "The Catholic," of 250 tons, while DU ROSSEY went to Brittany to fit out two other ships called "The Cardinal" and "The Victory." The Expedition met in January 1627, and the two Commanders sailed for America on the 22nd of February, taking with them about 530 men, whom they had got together as best they could, men who were not at all suited by their former lives to endure the fatigue of life at sea. The voyage was long and most trying. The want of discipline which prevailed in DU ROSSEY'S ship added to the miseries of this voyage, and only sixteen out of seventy men who had embarked with this Captain arrived at St. Kitts.

Moreover the landing was managed with the greatest confusion, and this caused fresh losses. The English Colony had been more successful. WAERNARD had

brought out to it a re-enforcement of 400 men, full of health, and well equipped.

However, D'ENAMBUC did not lose heart; he took formal possession at once—by a treaty—of his territory, which he was resolved, if need were, to keep by force of arms. On the 13th of May, 1627, he signed a Treaty of Agreement with the Chief of the English, by which the island was to be divided amicably between the French and English.* Soon after this DU ROSSEY was again sent off to France with two ships laden with Tobacco, to try and make men forget the unfortunate side of the expedition, and to try and procure fresh assistance. Scarcely had he reached Roscou in Brittany, when he allowed himself to be persuaded by Commander DE RAZELLI to join him in a secret and important expedition to the Irish Sea of which the latter had charge. In order the more easily to persuade DU ROSSEY to help him carry out his plans, he manifested the strongest sympathy in the story of the sufferings of the Colonists of St. Kitts, and at the same time he despatched a vessel, laden with flour, at his own expense. But the delay in DU ROSSEY'S return to St. Kitts was nevertheless very disastrous. As soon as DE RAZELLI'S expedition returned, DU ROSSEY was engaged by the "Company" to take out a reinforcement of 150 men to St. Kitts, but they almost all died on the voyage as the first had done—or on their arrival, in consequence of his imprudence and carelessness. When they saw how badly the French Colony was getting on, the English began to

* The original of this Treaty is preserved in the British Museum. It bears the signatures of Warner, d'Enambac, and others. See *Egerton M.S.*, 2395.—N. D. D.

threaten to invade it on the pretext that it was insignificant and had no prospect of success.

At this juncture D'ENAMBUC cleverly temporized, and went off himself to France in order to lay the state of affairs before RICHELIEU. The cardinal was very indignant at the insult offered to the French Settlement by the English, and promised to protect his people from them. On the other hand, he had heard that the King of Spain and Portugal was sending out his Admiral DON FREDERIC of Toledo to the Brazils, with orders to destroy the Dutch settlement there, and that he was instructed to go to St. Kitts on the way, and drive out of it the French and English. RICHELIEU had six large ships of war, belonging to the Royal Navy, fitted out besides two ships belonging to the "Company", and he put the whole under the command of DE CUSSAC, a vice-admiral and man of courage and experience, who left France for St. Kitts with D'ENAMBUC.

During his absence the English had taken advantage of the weakness of the French to annex their land, but on the arrival of the squadron, at the end of August 1629, the English were defeated and compelled to keep within the boundaries fixed by the "Treaty of division" of 1627; after which CUSSAC went to take possession of the island of St. Eustatius, and left some men, and built a fort there. He grew weary of waiting for the Spanish Admiral, and made the great mistake of allowing several of his ships to go sailing about wherever they liked, and he went cruising about himself in the Gulf of Mexico. Meanwhile the hostile fleet, consisting of 35 huge galleons, and 14 merchant ships fitted out for war, arrived at St. Kitts, and anchored close to the French

quarters, for the defence of which DU ROSSEY had been specially appointed. DON FREDERIC of Toledo immediately landed part of his troops, and entrenched himself opposite the French quarters. Meanwhile from the position which he was himself guarding, D'ENAMBUC had sent out his nephew, DIEL DU PARQUET, a brave young fellow—the joy and hope of the young colony—with a company of 120 men, to help the assailed: and the English, too, had advanced against the common enemy. But the troops of WAERNARD were the first to give way, and being seized with a panic, they rushed off to the mountains.* The rout of the English increased the irresolution of DU ROSSEY, who had already seemed to waver. Then, young DU PARQUET ashamed at seeing that his chief was allowing the Spaniards to advance without striking a blow, ran up to him, saying eagerly "Oh, sir, shall we let the enemy triumph over us without fighting them? Shall we let ourselves be massacred without making any resistance? Shall it be said that Spaniards attack Frenchmen without having proof of their courage? Come, sir, let us die with honour, or at least prevent their driving us away!" DU ROSSEY felt himself moved by these noble words, but rather with annoyance than honor, and he gave the order to DU PARQUET to advance, promising to follow and help him. At once the brave young officer sallied forth with his company, from the intrenchment, planted his feet on the

* This is a French account, for which no authority is given. Du Tertre says (Vol. i. p. 30) Du Parquet's men were seized "with a panic, which had also seized the English." In Sir Thomas Warner's absence, in England, the English were commanded by his son Edward, a lad of 18. An English account says:—"ye English retreated in order to their own quarters." *Egerton, M.S., 3295.—N. D. D.*

earth-works of the Spaniards, and rushed headlong upon them. He fired off his musket, and then hurled the weapon at the heads of those who opposed him. His two pistols missed fire, then he drew his sword and made a rampart for himself of the bodies of the enemies whom he slew. DU PARQUET would have carried the Spanish position, if DU ROSSEY had kept his promise, and had gone to his assistance. There were only three men left of all his company, all the rest being killed or disabled; he himself was covered with wounds, still he held out, and he did not see that he must soon be exhausted, as he was losing much blood. At last he fell, having received eighteen wounds. He was dragged by hooks out of the Spanish trenches, and carried on board the Galleon of DON FREEDRIC of Toledo, where he lived for eighteen days, surrounded by the respect and admiration of the enemy.

DU ROSSEY had abandoned his post, and had fled towards that which D'ENAMBUC still guarded.* He was not satisfied with being a coward himself, but he tried his best to persuade the French to leave St. Kitts, in spite of the entreaties of his friend. Consequently D'ENAMBUC separated from him, but he was threatened with death by his colonists, if he would not yield to the adverse tide, and leave St. Kitts; so, with part of his people, he embarked on the ship of a Captain LIOT, which was in the harbour and sailed for Antigua, while DU ROSSEY went back to France in the ship of another Captain named ROSE, and in France he was soon punished for his cowardice in the Bastille.

D'ENAMBUC resolved not to leave the West Indies, so he carried some of his people to St. Martin, some to

* At Sandy Point, or Dieppe Bay, probably.—*N. D. D.*

Anguilla, and some to St. Bartholemew's promising to return and fetch them soon, and then he took all the rest to Antigua. Some colonists of St. Kitts removed thence to the northern coast of the Island Hispaniola, and to the small Island of Tortola†, which is close to it and there they shared, with the buccaneers, and their immediate successors the filibusters, in establishing the great French colony of St. Domingo. D'ENAMBUC, with a little of his former good fortune, found a French ship at Antigua, commanded by a Captain named DE GIRON, who, as many of the contemporary writers say was celebrated for his long voyages, and who had increased his reputation by his services in the Royal Navy. GIRON was a kind hearted man, and offered to help D'ENAMBUC, and took him to the island of Montserrat to get provisions, and then sailed off to the coast of St. Kitts, to see what was going on there.

He found the English still in this island though they had capitulated, and sworn to the Spanish Admiral that he should not find them there on his return, telling him that they were not able to leave at once, because they had no ships. The French had made no promise to the Spaniards, but when Captain GIRON showed his intention of disembarking, the English appeared to oppose his landing. Immediately the valiant Captain gave orders to fight, fired into two English ships which were in the harbour, conquered them, and then haughtily anchored close to a third of the enemy's ships, which was much larger than the others, and swore that if a single shot were fired at him, he would sink it. This ship did not care about opposing the will of so deter-

* Tortuga.—*N. D. D.*

ained a man and made no signs of fighting. GIRON at once sent off the two ships he had captured to Montserrat, to St. Martin, to Anguilla, and to St. Bartholemew, to pick up all the Frenchmen who were there, and to bring them to St. Kitts.—They soon arrived numbering about 350, under D'ENAMBUC. Then GIRON spoke more loudly than before, and D'ENAMBUC threatened to subdue his foes. The English allowed matters to be established on the old footing, and D'ENAMBUC settled his Colony again in St. Kitts, three months after it had left the island. Some quarrel again arose with the English, but just as they were coming to blows, D'ENAMBUC summoned WAERNARD to surrender under a fig tree, which has since been historic; and then he forced him once more to keep within the limits of the treaty of 1627.

The English continued to have the advantage in numbers, for there were five or six thousand of them, and they tried to harass the French, and to take their lands from them, for the French were now reduced to 360 men, but they never succeeded in making the French yield to them, and the English even conceived such a terror of the French that they used to say as a proverb "Better fight two devils than one Frenchman."*

After so many reverses there came a sort of golden age in which the French in St. Kitts enjoyed prosperity and thought seriously of establishing colonies in some other West Indian island. They had voluntarily abandoned St. Eustatius because the water supply there was bad, and also the islands of Antigua, St. Bartholemew's, and Anguilla. But they had not given up St.

* Quantum valeat!

Martin, where they settled beside the Dutch. One of D'ENAMBUC'S lieutenants named LOLIVE, who was one of the wealthiest proprietors in St. Kitts, sent men secretly to report to him on Dominica, Guadeloupe and Martinique which had not yet been occupied since their discovery by Christopher Columbus, the two former in 1493, and the latter in 1502. Such a favourable report, especially of Guadeloupe, was brought back to him, that he immediately sailed for France, to go and enter into negotiations about the island with the "Company", independently of D'ENAMBUC.

On LOLIVE'S arrival at Dieppe in 1634, he joined a gentleman named DUPLESSIS, who was preparing a small expedition to the West Indies. They both obtained an authorization from the "Company" (which RICHELIEU formed on the 12th of February 1635) to hold the joint command for ten years of either of the three islands in which they should settle in consideration of their paying a tribute of a tenth of its produce.

They left Dieppe on the 25th of May 1635, in two ships, taking with them 500 men,—who were engaged for three years,—several families of colonists, and four missionaries of the order of St. Dominique, who were provided with a brief from the Pope URBAN VIII. The expedition landed at Martinique on the 25th of June, but, finding this island too full of precipices and snakes, it sailed away again to Guadeloupe, and took possession of it, in the name of the King of France, on the 28th of June 1635. LOLIVE landed with half his people on the North-west point of the island, and these hastily constructed a fort on the river, since called "La Rivière du Vieux-Fort;" to this post he gave the name of Saint

Pierre, in honour of the fête of this Saint which had happened to be on the day after he took possession of the island. DUPLESSIS also landed, and established himself a little more to the left on the "Rivière du Petit-Fort."

When D'ENAMBUC got news of LOLIVE'S expedition, about the middle of the year 1635, he set off to Martinique with a hundred resolute men, and a brilliant officer, named DUPONT, who was related to himself; he took possession of Martinique in the King's name, by order of the "Company," and laid the foundations on the seashore of the fort and town of "Saint Pierre de Martinique." In both the islands which the French had recently colonized war had to be made on the Caribs—natives of the islands—like those of St. Kitts, and this war could only be put a stop to by the complete expulsion of the savages. When the Caribs were not numerous enough to engage in open fight, they used to attack the French in detail; they slew many of them, with their clubs or poisoned arrows, and under cover of night they used to burn the dwellings, and ravage the plantations of the colonists. DUPONT found it easier to deal with the Caribs of Martinique, than LOLIVE with those of Guadeloupe. He was carrying the news of his success to St. Kitts, when he was wrecked in a storm on the shores of St. Domingo, and there he was taken by ten Spaniards, and shut up for three years in prison. One DU PARQUET (brother of the man who died so gloriously at St. Kitts), was sent to Martinique to replace DUPONT.* About this time, at St. Kitts, the venerable D'ENAMBUC

* Jacques Dyel du Parquet, who became seigneur of the islands of Martinique, Grenada and St. Lucia.—*N. D. D.*

died ; he had made his administration blessed by all men, and, though he had conquered the English, they had chosen him, on account of his wisdom, to be their arbitrator as well as that of the French. The mourning for him was general in both colonies of St. Kitts, but the French especially lamented the loss of this kind-hearted and worthy man, whom, with good reason, they regarded as the father of French Colonization in the West Indies.*

His lieutenant DUHALD, succeeded him with the title of Captain-General of St. Kitts, and LOLIVE was endowed with the same title at Guadeloupe—and DU PARQUET with that of Lieutenant-General at Martinique. The administration of DU PARQUET in this Island was as favourable to the progress of the Colony, as the tyranny of LOLIVE was injurious to the advancement of Guadeloupe.

DUHALD was compelled by bad health to give up his command, and RICHELIEU caused LONGVILLIERS DE POINCY (Knight of Malta, commander of Doysmont, and Vice-Admiral) to be invested with the office of Lieutenant-General of the King for all the French islands, and with the office of Captain-General of St. Kitts for the "Company." He was a remarkable man, of most resolute will ; on his way to St. Kitts, he called at Martinique and Guadeloupe to have his authority in these islands acknowledged. LOLIVE had removed his Colony from the north-west point of Guadeloupe to the south point, where Port Royal had been built, and after having made himself disliked by almost all his colonists, he had become blind. Nevertheless he attempted to maintain all his independence

* D'Enambuc is said to have been buried on the Windward side of Martinique.—*N. D. D.*

before DE POINCY. Shortly afterwards he was so imprudent as to go to St. Kitts, and there he was thrown into prison by DE POINCY, and soon of his own accord gave up his power, and shut himself up in his splendid domain in St. Kitts. AUBERT, who was both staunch and loyal, governed Guadeloupe successfully, made a peace with the Caribs which promised to be lasting, cleared new lands, improved the cultivation and attracted to it many Colonists; and thenceforward a large number of French and foreign vessels frequented the ports of Guadeloupe to carry on commercial relations with it. But Captain AUBERT was, ere long, supplanted by a gentleman named HOUEL, one of the members of the "Company of the Islands," who by intrigue got himself appointed Seneschal and Governor of Guadeloupe. This rival brought false charges against AUBERT, who was at last forced to leave, and seek refuge in St. Kitts—where he joined the fortunes of Commander DU POINCY, whose authority HOUEL refused to acknowledge.

RICHELIEU was dead; his loss was felt in the colonies as well as in France. During several years great anarchy prevailed in the West Indies. The enemies of Commander DE POINCY had got General PATROCLE DE THOISEY appointed in his stead, but DE POINCY refused to give up the power to his appointed successor, and maintained his position at St. Kitts by force of arms.

DU PARQUET, Governor of Martinique, deemed it his duty to support the new General, who had been sent out by the King and "the Company," but he fell into the hands of Commander DE POINCY in a raid which he made on St. Kitts, in the month of January 1645, by the order of PATROCLE DE THOISEY, who wisely remained

in the Island of Nevis. There were riots in Martinique and Guadeloupe, and THOISEY narrowly escaped falling a victim to a plot against his life. This General was given over to his rival, and was shut up in prison in St. Kitts, and an exchange was made by the people of Martinique of DU PARQUET for him. A rising against the tyranny of the Conqueror took place in St. Kitts, and DE POINCY was obliged to despatch General DE THOISEY to France, so that he being no longer in the island, could not be set up against himself by the insurgents. At last the Commander came to terms with the Court and with DU THOISEY himself, to whom he gave compensation in money and in produce. Whilst the Governors, who were supposed to be ruling in the name of the Company, were making rapid fortunes for themselves, and were establishing their own power more and more firmly, the Company itself was reduced to the lowest extremes of poverty. Therefore the Company resolved to sell at any price the remote domains which only nominally belonged to it. Guadeloupe was ceded, for £73,000—to be paid in money and sugar to BOISSERET brother-in-law of HOUEL, for the Company refused to treat with HOUEL himself. But HOUEL soon endeavoured to rob his brother-in-law of the bargain. He had begun to colonize MARIE GALANTE, of which he had just taken possession. The French had been succeeded by the English in St. Lucia, but the latter had been driven by the Caribs from this island at the end of a year, and it was after this expulsion that DU PARQUET had sent a detachment of troops to the abandoned territory, and had taken possession of it in the King's name, in 1650. The same year he had begun to form a

strong settlement in Grenada, and had left one of his cousins named COMTE, as Commander of it. On the 16th of August 1651, DU PARQUET obtained letters patent confirming the acquisitions of territory he had made, and giving him the title of Lieutenant-General for the King. Commander DE POINCY (as representative of the Knights of Malta, in whose name the purchase was made) bought for £120,000 the French part of St. Kitts, the French part of St. Martin, and the islands of St. Bartholemew, Santa Cruz and Tortola* where he had built forts. The Grand Master of the Knights of Malta raised DE POINCY to the dignity of Bailiff of the order and confirmed him in his appointment as Governor-General of the Islands. In 1653 the King of France, for his part, approved of the sales which had been made to the Order of Knights of Malta—reserving to himself the seigneurie, and a tribute of a crown of gold worth 1,000 crowns, at each change of reign. A great many negroes had already been imported from the coast of Africa to cultivate the plantations, and henceforth their number was much larger than that of the Whites, who narrowly escaped being massacred at Guadeloupe, in 1656. Whereas Governor HOUEL made himself detested in Guadeloupe by his tyrannous exactions, DU PARQUET made himself beloved in Martinique, where he died on the 3rd of January 1658, regretted by all classes. After the death of BOISSERET, HOUEL caused several riots in Guadeloupe by his tyranny. He had frightened his brother-in-law BOISSERET to death, and exhausted all his powers to rob of their inheritance BOISSERET'S sons D'HERBLAY and TEMERICOURT. But they managed to maintain their rights with the

* Tortuga.—*N. D. D.*

help of their uncle CHEVALIER HOUEL, to whom they conceded half their powers in the Colony, and they compelled the Usurper to sign a treaty of division, but he was permitted to keep the title of Governor during his life-time.

On the 31st of March 1660, a year after peace had been concluded with Spain, peace was made in the West Indies with the Caribs—by the mediation of HOUEL, and they gave up all their islands to the French and English, except Dominique and St. Vincent, to which they (numbering about six thousand)—withdrew, and these islands were declared neutral.

On the 11th of August 1668 DE POINCY died at St. Kitts—at the age of seventy-seven : he was often despotic, but always magnificent, and generous, an enlightened administrator, and skilful politician ; and he had held the command in the islands during twenty-one years, in the midst of the greatest difficulties. In spite of the constant opposition of HOUEL, DE POINCY alone had been able to unite in his own hands, the scattered threads of French colonization in the West Indies. He was replaced by Commander DE SALES, to whom was given the title of Administrator of the Seigneury of St. Kitts, chief of the French nation, appointed by the King for his eminence the Grand-master of the Knights of Malta.

But the year 1664 was approaching when the great Minister COLBERT was going to bring in so many reforms in the maritime and colonial system of France, or rather was about to remodel them altogether.

The West Indian Company was formed ; it held all the French possessions in America, with the exclusive right to trade with them. The French islands in the West

Indies were bought back by order of the royal council, dated April the 15th, 1664. The year before, PROUVILLE DE TRACY had been appointed Lieutenant-General for the King of all the French settlements in America, and he was commissioned to go with a squadron and troops, to take possession of the West Indian Islands as well as of Cayenne, which, at that time (as we have seen), was in the hands of the Dutch. After the taking of Cayenne, Governor DE TRACY went out to the West Indies to see the orders of the council, made in Paris, carried out. A hundred and twenty thousand pounds (Tours currency) were refunded to the children of DU PARQUET for the islands of Martinique and St. Lucia, (which the English had just taken from the French, but in which they were not to stay long). A special Governor named DE CLODORE was appointed at Martinique. A hundred thousand pounds (Tours currency) were paid for Grenada and the Grenadines to their possessor, the COMTE DE CERILLAC. For half of Guadeloupe, the whole of MARIE GALANTE and of DESIRADE, a hundred and twenty thousand pounds were paid to the heirs of BOISSERET. HOUEL alone persisted in refusal to sell his part, but he was nevertheless obliged to give up his Government, and it was bestowed on a man named DULION, as Governor for the King and for the new Company.

Finally the islands of St. Kitts, Santa Cruz, St. Martin, St. Bartholemew, and Tortola,* were also purchased from the Order of the Knights of Malta. In 1665, BERTRAND D'OGERON was appointed Governor of Tortola.* He devoted himself with admirable zeal to the task of getting the filibusters, who gradually abandoned Tortola,* to settle

* Tortuga.—*N. D. D.*

on the coast of St. Domingo. The settlements of "Cap Français," "Port de Paix," "Léogane" and several others of less importance were formed there. From this time the French West Indies belong to the general maritime and colonial history of France. We cannot however finish without calling attention, with sorrow, to the fact that the Island of St. Kitts, which was the cradle of French Colonization in the West Indies, was entirely given up to the English, by the treaty of Ryswick, in 1697.*

* The author gives as his authorities,—*Histoire des Antilles françaises*, par le P. du Tertre. *Histoire de Saint-Domingue*, par le P. Charlevoix. *Les Antilles françaises depuis leur découverte jusqu'au 1^{er} Novembre 1825*, par le Colonel Boyer-Peyreleau. *Almanach Américain*, *Notice statistique sur les colonies françaises*.

*Sea Defences.**

By Baron Siccama, Acting Colonial Civil Engineer.

THE seaboard and the banks of the estuaries of Guiana are alluvial, mixed with decayed organic matter, overlaying the older sand diluvium. The coastlands are made up of layers of clay, with alternate layers of sand, and sand and clay mixed. The sand is probably local, and belongs to the lower strata originally washed down from the higher land, but the clay must have been conveyed to this coast from other parts, for, in the interior as far as is known, the argillaceous formations, have not been found in sufficiently large quantities to account for this immense mud deposit. That the clay is brought here by the sea is shown by the fact that it is only found below high water mark, and where the influence of the tide is felt on the rivers. This sea-brought clay, constituting such a great proportion of the coast, evidently had an important part in forming these lands, warping them up and extending the dry land seaward, in former ages. If, therefore at the present time, the coast line is receding, it may be inferred that the quantity of the clay brought shoreward by the sea is diminishing. Now the question arises,—to what can be attributed this altered condition of the currents at sea, that formerly conveyed such a large amount of clay to these shores?

In the absence of precise records and observations

* Special lecture delivered to the Royal Agricultural and Commercial Society.—ED.

for many previous ages, this question can only be solved by reasoning from facts which we can now ascertain; and charts and maps of recent and present times can aid us in this. Looking at these maps, we see that nearly all the mouths of the creeks running through the new alluvial coast lands, open up towards the North-west or the West, and nearly parallel to the coast. The Barima, the Barama, Pomeroon, and Courabanna or the ancient mouth of the Mahaica, the Canje, the Nikeri and other creeks in Surinam, all show this feature. The Mahai-cony and the Abary do not show this so markedly, but nevertheless their lower valleys are lying in the same direction.

But there is an anomaly in this, for in all the deepest passes or fairways in estuaries in alluvial deltas, where no special conditions exist to alter this rule, it will be seen that they open up in the direction from which the tidal wave approaches the coast. Here we find it is just the opposite; the tidal wave comes from the East and North. The inference therefore is that in former ages the tidal wave must have come from the East and North.

There is good reason for allowing this as probable, and the cause of it may be found in the altered form of the bed of the ocean. In fact it is probable on the following grounds. Deep sea soundings indicate a ridge of new and uneven sea bottom to the eastward of Trinidad towards the Cape de Verde Islands. It is a sea bottom not smoothed down as yet, but full of hills and dales, not covered over with the thick layer of foraminifera or chalk, which in the older ocean basins everywhere covers the original surface. On ethnological grounds too the existence, in previous ages, of land more or less continuous

between the Antilles and Africa is surmised, owing to many facts that have been observed; as for instance a similarity in racial features between certain peoples in these two now widely separated countries, also similarity in their dwellings, examples of which on this side of the Atlantic are to be seen in the ancient edifices that are to be found so plentifully in parts of Central America. These facts go towards proving that communication between the peoples of America and Africa existed at some time long previous to the advent of Europeans in these parts, and this communication could only have been conducted by land roads or by short sea routes, practicable for men in that early stage of civilisation and knowledge.

If it be conceded that unsubmerged ground existed at one time to the East of Trinidad, an explanation is found of the altered direction of the tidal wave. Such an obstruction as the land would present, would deflect the wave from its normal direction, and after striking the mainland it would flow past these coasts from the North. The current would then carry the clay from the Orinoco to the South and East, and the mud forming such a large part of our coast lands, would therefore come from that river. Since this obstruction to the East of the Antilles subsided or was washed away, the Orinoco mud has gone towards the North and Trinidad, and no longer assists in making land in Guiana; and our coast instead of forming sea-ward, is being washed away under the influence of the Atlantic waves.

That the full effects of this changed condition have not yet been reached, can be seen by comparing the most ancient charts with the present situation. In the oldest

charts the deepest passes into the Essequibo river lay near the Western bank and then through the islands towards the East bank; they are shown between Tiger Island and Wakenaam, and right across the river to Fort Island. The Parika channel, originally the ebb channel, was, a hundred and fifty years ago, still unimportant. BOUCHENRODER'S original chart shows this. Even in the chart of 1804, it shows distinctly the formation of an ebb channel with banks surrounding the mouth. Now the Parika channel is gradually deepening, and the banks are ranged more to each side, allowing the flood wave to enter more freely.

In the oldest charts of the Demerara river it may be observed that the channel across the bar then lay nearly due North from the river mouth. The chart of 1804, shows it some degrees East of North, whereas the later charts show it 10° East of North, and now it is reported that deep water is forming again East of the Lightship, showing that the entrance channel is slewing gradually eastward. In the Berbice river the deepest passage in an old chart is shown between Crab Island and New Amsterdam; now it is the channel West of Crab Island that is deepening, showing that the flood current sweeping round the East point into the river, scours this passage more and more.

The large quantities of mud formerly brought from the North being no longer deposited on the foreshores, and the current taking away the deposits of former years, the sea in front is deepening, very slowly it is true, but steadily. The outlying mud-banks formerly acting as a break-water to the main coast are gradually being carried away and are not being replaced by other deposit, and

the coast as a matter of course is receding. This process must have been going on some long time previous to the arrival of Europeans, but it was not observed until the rich coast lands were brought under cultivation, at which time the sea-dams were laid well under cover of the bush that protected the foreshores. It was only when the sea had encroached on the foreshores and threatened the sea-dams that it was noticed.

In itself it is nothing wonderful that a loose earthen dam should not be able to withstand the action of sea surf; and so long as these dams could be retired, and only low and valueless front lands had to be abandoned, nothing was more easy than to make a dam further landward as soon as the old dam showed signs of weakness. But times have altered now; for it is a different matter when valuable properties have to be guarded. Now the important question to be decided is, whether it is worth while to pay for an adequate sea defence, or more economical to abandon the land altogether. When there is no hope that the washing away of the shores will stop, and when once it is decided to arrest the inroads of the sea, the most economical process is to do good work even at a higher price. Under ordinary local conditions, this however need not be a very costly affair.

The coastlands were formed principally by the action of the sea, which is evident by the ridges or banks found parallel to the shore line all along the alluvial lands of the colony. The original sand formation slopes gradually from the higher lands of the interior to the sea. Under the action of the wind from the sea the swell approaching the coast changes from the normal wave to waves of translation as soon as the waves arrive in shallow

places where the depth is less than three times the amplitude of the wave. This is caused by the lower particles of water in motion encountering a resistance from the bottom of the sea and losing their velocity. But the resisted water has the effect of pushing before it the material of which the sea-bottom is composed, and conveying it landward. At the line where the ocean waves begin to feel the influence of a shallow bottom will generally be found a slight bank, upon which the waves will break and become rollers. These rollers have also a tendency to convey landward in their course the material of which the sea-bottom is composed. The direction in which this solid matter in suspension is moved depends on the direction of the waves, and where currents exist, partly on these.

Where, therefore, an important deposit of mud forms the sea-bottom, this is pushed up to the coast, and where this is not found, sand or shell is washed up. If the out-lying banks are high, the sea breaks on them, and they act as a breakwater to the coast. Where, however, the current takes hold of the solid particles in motion, these banks, change place and move in a direction more or less with the current. To this is owing the changeable nature of what is called the wash. When these out-lying banks act as breakwaters they shelter the coast and form smooth water in front of the coastline. When these banks have moved past, the rollers rush forward and only break near or on the shore line.

In considering the sea defences, the lie of the land is a great factor. On the coast the height of the land is pretty generally about high water of neaps. There are few sea dams where a certain length of foreshore is not

visible at low water, neaps. But in the worst cases the foreshore is dry at low water, springs. The engineering difficulty of the sea defences for our shores is, therefore, not very great, and no gigantic works are necessary. The great trouble is that soft and unprotected soil cannot withstand the action of the surf.

When dikes were first constructed on alluvial lands all sorts of devices were adopted for protecting the seaward slopes. Seagrass, straw-matting, wicker-work and such like material were tried. In more important cases three rows of piles protected the dam. Where better means of transport were available, all these imperfect protectors were replaced by a stone-pitched slope. And this is the only system recommendable in this colony, as may be seen at any of the places where it has had a fair trial. A really good and solid dam should reach to about 3 or 4 feet above high water, spring tides, according to its more or less exposed situation. It should be wide enough on the top for a waggon road. The gradient of the seaward slope, if sandy, should be three to one; but if of good clay well rammed, two, or one and a half, to one is sufficient. A good sea dam must be properly constructed. It is not sufficient to throw it up with shovel-men, in large loose clods: the material must be carried up, properly thrown down in layers and then rammed. If the soil is too dry the stuff should be well watered and puddled. The back slope need not be as steep as the sea slope; but the nature of the material at hand must be considered in this. Then the seaward slope must be overlaid with stone of sufficient weight not to be moved by the waves. As a rule, a stone weighing over a hundred pounds, if well laid and packed, will be found sufficient,

except at the toe of the wall, where heavier stones should be laid so as to guard against undermining and to form a foundation against the stone slipping down.

Where the dam is made of good stiff clay, the stones can be bedded in it, and if smaller stones are driven into the dam at places where joints will fall, the work is sufficiently substantial. If only sand or loamy stuff can be found, and this cannot even be covered with a layer of puddled clay, a matting of thin branches, or long grass, must be laid before the stones are placed in position. This will prevent the sea from underwashing the stones, and last long enough for the interstices to get filled in with shells, barnacles and drift.

All this refers to a new dam that is to be constructed on new ground. In cases where old dams have to be dealt with, and the sea slope is in a good state of preservation it is better to use the slope as it is, even if it should be at a steeper gradient than two to one. In cases where the sea slope is already much eroded, it is better to fill up the steep side with stone than with earth, unless very good clay stuff can be obtained. Except in very exposed situations a stone covering of 18 inches thickness will be found sufficient. Where the sea breaks heavily upon the dam an elevation of 3 or 4 feet above high water will not be sufficient to keep splash water coming over the top. If the top, however, is properly clodded and covered with grass, and the back slope is in good condition, overgrown with grass or small bushes, no serious damage need be feared to the dam.

In many cases all this expense could be saved by protecting the foreshore, particularly where the wash under-

cuts the upper layers of the ground. This could be done by laying down rubble on these escarps so as to protect them and the roots of the courida bush from further erosion. The overgrown foreshore would then afford sufficient protection to the dam and break the waves. Where enormous cost has been incurred by building so-called seabreakers it has seldom answered the object aimed at. The waves rush over and pass these rubble walls in undiminished velocity without bringing in sufficient deposit to form a raised foreshore. Besides, works of this kind are very expensive, and take more stone per lineal foot than a stone pitching laid on the dam to the same height.

In sea defence work the great thing is to know how to do it. Everybody cannot build a rubble fence that will stand, although it is easy enough to describe one. So it is in this case; persons who know nothing about it will dabble in the work until they find they have literally thrown their money into the sea, and then they realise the fact that the building of sea defences is a trade of itself that can be learned only after long labour and experience.

The construction of a sea dam as is here described, is only one type of a system of defences, but the one which might be locally of most use. There is however as much variety in the way men have to fight the sea for dry land to live on as in any other struggle for life.

As I have already observed, in this colony works of modest dimensions are sufficient, and even very primitive sort of work is of some use here, which in other seas would be swept away like children's castles on the beach. Where a heavier surf beats upon a sandy coast, the works have of necessity to be of larger dimensions; it is simply a question of weight and size. It is when the sea

has eaten down into the submerged foreshore, and deep water channels are forming near the dams that the real fight begins. Then it is not only a question of masses of stone, but one of choice of place, and it is here that the engineer is required; he must study the past and the present, so as to be able to predict the future and to know what he must guard against, and what the dangers are that threaten.

To be able to comprehend the situation clearly a trustworthy survey is indispensable. Luckily in this colony very difficult problems need not be solved, and with some observations, a pilot chart or two, and experience of that sort of work, something may be done and some useful conclusions arrived at; for a hydrographic survey of these coasts and estuaries is as yet a long way off. I consider it however of the very greatest importance that every one interested in the colony and its welfare, should assist in collecting facts; not alone the pilots and captains of the colonial steamer, but every one living near the coast, for all at times can give useful information. The set of a current, an eddy in an unexpected place, shallowing or deepening of a channel, the displacement of a bank or even shells or wreckage thrown on the shore,—all these can give indications which collected can lead to knowledge of important facts. Automatic tide-gauges are also useful informants, but there is not one in the colony. If a great many facts are recorded, in time a useful amount of information can be collected, haphazard decisions will become rarer, and those who have to decide on the execution of sea defence work, will have some trustworthy data to go upon.

Report on Skekel's Sugar Mill.

By the Hon. B. Howell Jones, President of the Society.

DURING the year 1888, Mr. D. SKEKEL brought to the notice of the Society a new cane mill which he had patented, and he showed a model of his machine before the Society.* The advantages claimed for this new form of Cane Mill were prevention of the re-absorption of the juice by the megass when passing out of the last pair of rolls, the doing away with the trash-turner and the friction caused thereby—a small grooved roll travelling at a quick speed taking the place of the ordinary trash-turner—and the lower horse-power required to drive such a mill.

The new mill of Mr. SKEKEL excited considerable attention both amongst engineers and sugar planters, but either from want of pluck or want of means no one took up the patent to give it a trial until Mr. W. SMITH of Plantation *Herstelling* came to the front, and he ordered through Mr. SKEKEL a new pair of headstocks designed for SKEKEL'S mill, utilising the old rolls on the estate to complete it. I may say here that these rolls were considerably worn and of different diameters. The mill was erected at the beginning of the year to take off the present crop, and when started was visited by a great many engineers and planters and gave a favourable impression as to its capabilities as a cane-crushing machine; but beyond some trifling experiments which could hardly be considered satisfactory, no actual figures

* See *Timokri*, vol. ii, 1888, p. 207.—ED.

as to the results obtained could be given, and it was, in my opinion, necessary that actual data should be furnished by the patentee if others were to take up the machine. I may say there were no appliances on the estate for conducting these experiments. After the lapse of some time I obtained permission from the patentee and Mr. SMITH to make a test of the machine, and asked Mr. CORNISH, as engineer, and Professor HARRISON, to assist me in conducting the experiment. Unfortunately on the day fixed Professor HARRISON was too unwell to attend, and Mr. DOUGLAS, the chemist of Plantation *Diamond* filled his place.

On Thursday, 20th August, twelve tons of canes having been weighed on the previous day by a clerk from my office, and the weight verified by one of the employees of the estate, on a large platform scale kindly lent for the occasion by the Government through Mr. DARNELL DAVIS, a careful test of the mill was made in presence of Mr. FINNEY, the engineer of the estate, and Mr. SKEKEL as patentee and representing Mr. SMITH—Mr. CORNISH taking the results of the working of the engine, Mr. DOUGLAS watching and measuring the juice, the weighing of the megass being assigned to Mr. R. W. H. JONES, late of the Sydney Sugar Refining Works in Australia, and Mr. SKEKEL, the cane carrier being superintended by myself. Everything was carefully done, Mr. DOUGLAS taking numerous samples of the juice and canes for analysis; and all expressed themselves as satisfied with the manner in which the experiment was conducted, and that it was a fair test of the mill's power.

The difference in the size of the rolls was, I think, against the mill, as although the megass was finely broken,

the results show it created a false impression, as judged by the eye. I think most of those who saw the experiment, anticipated a much higher percentage of crushing, and this demonstrates what I have always held to be the case, that it is almost impossible to judge the work of a mill without actual analysis. I am under the impression myself, and I think others agree with me, that had the rolls been all of equal size better results would have been obtained; but we had to take the mill as we found it, the patentee running this amount of risk.

The canes experimented on were free from all trash, and of good average quality.

The following are the reports of the Chemist and Engineer :—

Diamond, 22nd August, 1891,

The Hon. B. Howell Jones,
Georgetown.

Dear Sir,—Herewith I send you a report of last Thursday's mill trial at "Herstelling."

The result, though good single crushing, is somewhat disappointing, coming after the glowing accounts of this mill which have been going the round of the Colony recently. The appearance of the megass on the elevator certainly led me to expect a better result. An explanation of the finely divided condition of the megass has just occurred to me, the rolls of the mill from frequent turning up are all of different diameters, the thickest being I understand as much as 2 inches greater in diameter than the thinnest, the rubbing action of the roll surfaces on the megass owing to different circumferential speeds of rolls is quite sufficient I think to account for the fine division of megass.

The result of the trial is, I think, fairly reliable within the limit stated, that is $\frac{1}{2}$ o/o above or below.

I am,

Yours very truly,

WILLIAM DOUGLAS.

REPORT OF THE TRIAL OF SKEKEL'S PATENT CANE MILL AT PLN-
"HERSTELLING."

20th August, 1891.

Weight of canes (weighing on previous day)	12 tons.
Weight of megass	8,758 lbs.
Weight of juice	17,018 lbs.

being 1,590³ gallons juice, measured at 30°C.

Specific gravity at same temperature being—1.0702.

The crushing can be calculated from three sets of data, and errors will be best eliminated by taking the average of the three results as the correct one.

I. Crushing calculated from weight of canes and megass—both, weights being uncorrected—

Weight of canes	26,880 lbs.
Weight of megass	8,758 lbs.
then $8,758 \times 100 = 32.88$ o/o megass.	

26,880

and $100 - 32.88 = 67.12$ o/o crushing.

This result is certainly too high, because there was an unavoidable mechanical loss in handling megass from mill to weighing machine as well as loss of weight from evaporation—corrections for these losses are difficult to apply.

II. Crushing calculated from weights of juice and megass—

Weight of juice... ..	17,018 lbs.
Weight of megass	8,758 lbs.
∴ Weight of canes	25,776 lbs.
then $17,018 \times 100 = 66.03$ o/o crushing	

25,776

III. Crushing calculated from weights of canes and juice . Weight of canes being corrected for loss during period between weighing and actual crushing—1 day = Correction—2 o/o deducted from weight—

Weight of canes 26880 lbs.—2 o/o = 26342 lbs.	
Weight of juice	17018 "
then 17018×100	

$26342 = 64.81$ o/o crushing.

26342

Mean of three results —

$$\frac{64.61 + 66.02 + 67.42}{3} = 66.02 \text{ o/o crushing}$$

3

the probable error of this result is + 0.03

I take 66.02 o/o as the correct crushing, and will use the data of computation II (which yields same result) in the further calculation of sugar extraction and loss.

Cane.	Juice.	Megass.
—	—	—
25,776 lbs.	17,018 lbs.	8,758 lbs.
	Analyses.	
Cane.	Juice.	Megass.
—	—	—
(actual determination.)	(actual determination.)	(calculated.)

	lbs. per gall. = 0/0 by wt.	
Fibre ... 11.30 o/o		Fibre ... —
Saccharose 13.00 o/o	Saccharose ... 1.644 = 15.36	Saccharose 8.41 o/o
	T'tl Solid Matter ... 1.916 = 17.90	
Juice ... 88.70 o/o	Spec. Grav. at 30° C (17.5 S 30) — 1.0702	
	Quotient of Purity 85.8	

Factor (specially determined for this lot of cane) to convert Saccharose o/o in juice to Saccharose o/o in cane—0.8457.

The juice was sampled continuously at mill bed and at clarifiers during the course of the experiment. Juice heater was not working.

The mean of the two following analyses is taken as the average composition of the juice :—

Cane Juice

Sample from Mill Bed.

lbs. per gall. = 0/0 by wt.

Saccharose ...	...	...	1.635 = 15.35
Total solid matter ...	...	...	1.916 = 17.90
Specific gravity at 30°C	...	...	(17.5 S 30) 1.0702

Sample from Clarifiers.

lbs. per gall. = 0/0 by wt.

Saccharose ...	...	...	1.653 = 15.45
Total solid matter ...	...	...	1.918 = 17.90
Specific gravity at 30°C	...	...	(15.5 S 30) 1.0702
Quotient of Purity ...	...	...	85.23 76.21

then total sugar in the canes—

$$\frac{25776 + 13}{100} = 3351 \text{ lbs.}$$

100

Sugar in juice—

$$1590^{\circ} \text{galls. @ } 1^{\circ} 64 \text{ lbs. per gall} = 2614 \text{ lbs.}$$

$$\text{and } 2614 \times 100 = 78^{\circ} 01 \text{ o/o of sugar in cane extracted in juice.}$$

3351

Saccharose in cane ...	...	...	13.00 — 100.00
Saccharose in juice extracted	...	...	10.14 — 78.01
Saccharose lost in megass	...	...	2.80 — 21.99

WILLIAM DOUGLAS, F.I.C., F.C.S.

Diamond, 22nd Aug. 1891.

3rd Sept., 1891.

*Pln. Herstelling—Memo. of Indicated Horse Power of Engine driving
Cane mill, during trial run, on 20th August, 1891.*

Diar. of Steam Cylinder 28" inches

Stroke, 42" "

Diar. Piston rod, 3½" "

Engine makes 13 revolutions for one revolution of Mill. Engine
Works mill, Cane Carrier, Elevator, Liquor pump, and Cold
Water pump, (latter about 3½" diar. 21" stroke.)

Mill—Top roller 26" inches diar., 54 inches face.

„ Back „ 25½" 25½" "

„ Front „ 25½" 24½" "

It is fitted with Skekel's patent Head Stocks and Rotary Turner.

A pressure gauge was fixed on the steam main, close to the Engine
Cylinder, and the pressures shown are given in the accompanying table.

It must be noted that no diagrams were taken from the bottom of the
Cylinder, too much condensed water was present to render them of much
use. Also that the hole for Indicator Cock was drilled into hollow
cylinder cover. This was not discovered until the experiment was
about to commence, and then a piece of pipe was screwed into cover, to
prevent steam from filling the cover at each stroke. This was done as
carefully as circumstances allowed, but one could not be sure that no

steam got into the cover at each stroke, because the inner end of tube was carefully fitted, but could not be screwed at lower end.

No. of Card.	Pressure at Gauge, lbs.	Planimeter Reading.		Average effective pressure.		Revs. per Min.	H.P. by Card.
		Maxm.	Minm.	Maxm. lbs.	Minm. lbs.		
1	50	576	567	34'56	34'02	24	75'4
2	50	589	582	35'34	34'92	32	89'3
3	50	575	288	34'50	17'28	30	61'7
4	50	545	508	32'70	30'48	36	90'4
5	54	599	599	35'94	35'94	40	114'6
7	54	423	288	25'38	17'28	33	55'9
8	54	411	391	24'66	23'46	36	68'8
9	54	367	240	22'02	14'40	36	52'1
10	50	426	426	25'56	25'56	34	69'1
11	55	286	246	17'16	14'76	36	45'6
12	50	437	399	26'22	23'94	36	71'7
		5,234	4,534	314'04	272'04	373	794'6
				272'04			
				586'08			
				2 x 11	26'6 lbs. mean p.		

Each card shows 5 to 8 diagrams—i.e., the indicator pencil was allowed to mark during 5 to 8 consecutive revolutions of engine; the extremes of these are taken as "maximum and minimum" in the above.

$$\text{Then } \frac{5234}{11} = 47.582 \times 0.6 = 28.54 \text{ lbs. max. average of cards.}$$

$$\frac{4534}{11} = 41.22 \times 0.6 = 24.73 \text{ lbs. min. do.}$$

$$\frac{53.27}{2} = 26.6 \text{ lbs. mean effective p. of the cards}$$

$$\text{Area of Cylinder } 22'' = 380.133$$

$$\frac{1}{2} \text{ piston rod, } 3\frac{1}{4}'' = 5.34$$

$$374.793 = \text{effective area of Cylinder.}$$

$$\text{And } \frac{373}{11} = 33.9 \text{ mean Revs. per min.}$$

$$374.793 \square'' \times 26.6 \text{ lbs.} \times 33.9 \text{ r.} \times 7 \text{ ft.}$$

$$33,000$$

Trial began at 12h. 55m.; ended at 2h. 13m. = 78m.

Stoppages for megass to be disposed of for purpose of weighing = 13,,

Leaving actual time occupied in crushing the 12 tons of canes 65,,

Quantity of Juice, as per Mr. Douglas's report, 1590.2 galls.

Gallons per hour $\frac{1590 \times 60}{65} = 1468$ gallons per hour.

And $\frac{71.7}{14.68} = 4.88$ I.H.P. per 100 gallons expressed per hour.

Friction diagram, taken when cane carrier (nearly full of canes) and elevator (empty) were working; no canes between the Rollers—gave 4.4

7.6

12.0

2

$= 6.0 \times 0.6 = 3.6$ lbs. mean effective pressure.

And $\frac{374.79 \times 3.6 \times 7}{33,000} = 0.28$ I.H.P. per rev.

Taking mean revs. per minute as before—or 33.9 gives for friction $33.9 \times 0.28 = 9.49$ I.H.P.

During the above trial, no use was made of the exhausted steam which escaped through loaded valve; cards show the back pressure to be about 10 lbs. per sq. inch.

The results of trial, are as below: measurement of juice; o/o crushing and Fibre in cane having been determined by Mr. Douglas:—

Weight of canes crushed	...	...	26880 lbs.
Time occupied in crushing	...	...	65 minutes.
Crushing—as given by Mr. Douglas	...	...	66.02 o/o
Fibre in canes—as given by Mr. Douglas	...	...	11.30 o/o
Mean indicated Horse power of Engine	...	...	71.7 I.H.P.
Mean indicated Horse power per 100 galls.	...	...	...
per hour	...	...	4.88
Friction card—under above named conditions	...	...	9.49 I.H.P.

T. S. CORNISH.

Georgetown,
September 2nd, 1891.

Hon'ble B. H. Jones

My dear Sir,—I have received Mr. Douglas's report on the working of the Herstelling sugar cane mill for which I thank you.

From the dry and pulverized appearance of the megass and the uniform squeezing of the mill—I, like Mr. Douglas, anticipated a higher extraction of cane juice. I fully expected 70 per cent. on the weight of canes passed through the Mill would have been the final result of extraction.

Comparisons are said to be odious; but I cannot refrain from referring to one, and when looked into it shews the Mill at Herstelling has not come out of the trial badly.

I am informed by Mr. Aitchison, the engineer of Pln. Vreyheid's Lust, that the 5 roller Mill on that estate gives an average extraction of 68 per cent. of the weight of canes passed through the Mill. Taking Mr. Douglas's first formula on this head, the Herstelling Mill is allowed to have extracted 67 $\frac{42}{100}$ per cent. or within $\frac{1}{4}$ per cent. nearly of the 5 roller Mill at Vreyheid's Lust.

The ratio of gearing attached to the Vreyheid's Lust Mill is 25 to 1, while the Herstelling Mill is 13 to 1. The former nearly 100 per cent. more powerful than latter. The rollers at Herstelling Cane Mill owing to repeated turnings of their surfaces, are according to the following dimensions:—Top roller—a new one, 26 inches diameter. Lower part roller—25 $\frac{1}{2}$ ins. diameter, and final crushing rollers—24 $\frac{1}{2}$ ins. diameter.

Had all the rollers the same diameters, and their surfaces running at the same circumferential speed—better results might have been obtained. I am unable, from practical experience, to give an opinion on any of the others.

In ordinary Mills, where first cost is no consideration, I would advise an entire new Mill in preference to altering the old one, and I consider better results would follow.

I shall be glad to have Mr. Cornish's report.

Yours respectfully,

DONALD SKEKEL.

The Extension of the Telephone in British Guiana.

By S. Vyle, M. Inst. T.E., Government Electrician:



CONSIDERABLE amount of satisfaction has been experienced in England at the recent expiry of the BELL and EDISON Patent, which, very harshly applied, made the Telephone a huge monopoly in Great Britain, and very largely delayed its development, so that hardly any of the large cities at home are thoroughly equipped on any recognized plan. Even London has been so poorly served, both in numbers, and quality, that at the last meeting of the British Association held at Edinburgh, a lengthy paper was read on "The telephoning of great cities," which has led to a considerable discussion in the *Times*, and most of the electrical papers. The little instrument is found so useful in time and distance-saving, that people wonder now how they got along before without it.

Already there are signs of a vigorous opposition to the old Telephone Company in England; but as it has very largely bought up all its subsidiary companies, it is likely to hold the field; and if they are but wise in their generation they will give an improved service, at cheaper rates—the only way by which they can hope to save themselves. The yearly rental in London has been \$96, whereas the new scheme asks only for \$48, for which sum they claim they can earn an interest of 4 o/o, for, on account of the enormously watered stock for which the original Company is responsible, and which is considerably over \$40,000,000, the interest upon this

large sum must necessarily demand a much higher rental. It was somewhat doubtful whether the Postal Department in England, would assert its right, and buy up the telephonic interest, and work it ; but Mr. RAIKES, the late Postmaster-General decided not to do so, leaving matters just as they were, though the majority of the Governments on the continent of Europe, who had before allowed private companies to work the Telephone, have revoked such licences, and they now work the Telephones as a State Department. France was most conspicuous in this, and has been followed by Germany, Italy and the smaller States, amongst whom Switzerland and Sweden take the lead for having the highest ratio per thousand inhabitants, as users of the Telephone. For actual improvement and cheaper rates, Manchester in England has given the example of having a Telephone Exchange on the mutual principle with a \$24 rate.

But the question to be considered for British Guiana, where the lowest rates still prevail, is not how to telephone large cities, but how to telephone the colony, so that not only shall Georgetown and New Amsterdam enjoy the advantages of their Exchanges, but that every estate may have the opportunity of communicating with its centre of business—viz : Georgetown.

The early history of the Telephone in Georgetown is one of vicissitude, as by turns private individuals demonstrated the value of the little instrument, which at first was confined to the Telephone proper, now used for hearing with only. I believe that to Captain WHITE belongs the honour of first introducing the Telephone to the colony, and for the purpose of illustrating its value, a line was specially run connecting Mr. JNO. VIRTUE'S two

places of business, the one being where it now is, and the other a branch in the Brickdam. His Excellency the Governor, members of the Court of Policy, and the business gentlemen in Water Street, were invited to test its powers ; but at that early stage of its career, and before the invention of the microphonic part, it was little better than a toy, although the present instruments will transmit speech without the microphone with remarkable clearness and volume. That is largely due, however, to the better finish which fourteen years' experience has brought about. The results however were considered satisfactory, but the matter dropped.

A few years later an enterprising American landed here with 100 complete Telephones and material to connect them up, but there was some impediment in the way beyond the great regard the party in charge had for the good things of the colony, and so after a period at the Tower Hotel, the Telephones were re-shipped to New York, and the subject rested awhile. But the merchants of Water Street, hearing that a practical time-saving instrument was in operation in other parts of the world, would not let the matter alone, and the result was that in 1884 a small exchange of some 30 subscribers was opened at the Telegraph Office, Georgetown, under Mr. HODGSON'S *regime*, and erected by Mr. BENSON. The mistake, however, was made of choosing the wrong class of Telephone, the Ader—a French make—having to depend upon chemical batteries to ring the bells, as well as operate the talking part of the instrument.

It having been the custom here to regard the soldering of joints in the Telegraph wires as an unnecessary expense, the same plan was adopted with the Telephone

wires. In the result, excessive evaporation of the batteries appeared to set in, and that, coupled with the gymnastic feats it had to perform at each joint, soon exhausted its energies, and the cry "We cannot get the Exchange" showed that the current was too weak to do its work. Differences of opinion arose where the non-technical man posed as full of technical knowledge, and the result was that the expert let the responsibility rest where it had been assumed, for which however the subscribers to the Exchange suffered. This state of matters resulted in the expert being pensioned, and new blood introduced from England, whilst the promotion to other parts of Postmaster-General HODGSON left the field clear for fresh operations. The old Ader Telephone was patched and altered, and tried in every way, only to discover at last its too faulty construction, and uncertain electrical action. That knowledge gained, those instruments were from that time practically condemned, and new ones known by experience to work well in England, recommended.

But changes cannot be effected rapidly in a Department of the State where monies are only voted once a year, and therefore the old Exchange with its old instruments was continued as best it might from 1888 until 1889, when all the merchants in Water Street terminated their connection therewith at the end of the year, and only the Government Departments and the Police worked during the month of January 1890. In the result, two petitions put forward—one that the Telephones be handed over to a private company, and the other that the rates be reduced from \$48 and \$36 to \$24 and \$12 per annum—led to a reconsideration of the whole

question, resulting in the recommendation that such rates could be accepted provided a Switch Board of not less than 200 subscribers were filled, these to be operated by lady attendants, with a night and day, or rather a *continuous* service. However poor the Service was, the merchants found that cabs were worse ; and by a gracious concession of the Lieutenant-Governor Sir CHARLES BRUCE, all the old subscribers were reconnected free of charge till the new Exchange could be opened. Lady attendants were engaged and trained, and with the greater politeness and attention, the merchants cheerfully made the very best of the old service, and thus matters jogged along till in December of that year a commencement was made towards building the new line for the existing Exchange. The work was vigorously pushed, resulting in the opening of the Exchange for continuous service in August 1890. Since that time, the Exchange has never ceased to have an attendant in waiting to respond to the various calls.

Kite-flying has been a nuisance to the good working of the lines, especially in damp weather, when a mere thread will carry the tiny high tension currents used for ringing, and more especially for talking. Hence voices other than the one desired are often heard. There is also a large sized spider's web which occasionally, in damp weather, becomes a conveyor of telephone currents ; but a worse enemy than either kite strings, or spiders' webs, has lately appeared in the guise of Electric Lighting workmen, who with Yankee training, recklessly ignore the Telephone wires, which they look upon as convenient rollers with which to help their heavy cables over ! The months of November and December have been prolific of faults from that

cause, and to show the far-reaching results of such recklessness and want of care, the wire of the West India and Panama Company's Cable had one of the Telephone wires, so strained, dropped on to it, three days in succession, whereby Demerara was cut off for hours from the outside world, and important cablegrams delayed. The *modus operandi* was this : to throw a rope over the Telephone line, and drag away at a Cable wire attached to the end of it—which had strained the telephone lines, so as to put them in contact with the Panama Company's wire, thus putting Trinidad into communication with the Georgetown Telephonic Exchange.

The 200 wire Exchange opened in August 1890, having been worked satisfactorily, and a large number of would be subscribers being unable to get the desired accommodation, a new Board for 200 additional wires was ordered, and recently arrived in the colony. New Amsterdam also, had at the same time a 50 wire Board, to meet its requirements, together with the necessary wires, &c.

But now comes a new phase of telephonic extension not provided for up to the present. For some years the estate of *Nonpareil* has been in telephonic communication with the Buxton Post Office, and any one desirous of telegraphing to Mr. HARRY GARNETT had his message telephoned on from Buxton to *Nonpareil*. Before these lines are in type, the genial Manager of *Nonpareil*, will be able to speak by Telephone to any other subscriber in Georgetown. Provision has also been made to connect *La Bonne Intention*, when Mr. LUARD will be able to have a chat with *Nonpareil* via Georgetown, if he feels so inclined.

Now the planting community is composed of gentle-

men keenly alive to their commercial interests, and it is not betraying any secret to say that numbers of proprietors and managers on the East Coast, are desirous of telephonic communication with Georgetown. They know the value of a time bargain, and how the Telephone will enable them to know prices in advance of the *Daily Chronicle*, smartly as it is distributed ; and therefore what one has of value, the others consider a necessity to them also. That is a prospect not quite provided for, and it will have to be looked squarely in the face. The cost to the estates will be met over and over again by saving in other directions. The East Coast itself, having no less than twenty-three estates, would also require that the Police centres, and the doctors and engineers in the district be joined, so that a thorough inter-urban section might be arranged for. Then what is good for the East Coast, will be of value to the estates upon the East and West Banks of the Demerara river, and the West Coast. To supply the two latter—the West Bank and West Coast—one large submarine cable would be required ; but for a good number of wires, the cost would not be nearly so great per wire, as for a single one. Such a service would only cost a little more than that for the East Coast ; but the value of it (where a wide river like the Demerara rolls between), would be so much greater, that the extra cost would be cheerfully paid. In that way the value of the Telephone in British Guiana would be very greatly enhanced ; and if New Amsterdam and Suddie were made local Exchanges, with what is known as Trunk wires between Georgetown and New Amsterdam, and Georgetown and Suddie, the estates on the Corentyne Coast and Berbice

river and the Arabian Coast would be accommodated. Leguan might also be treated as a separate centre for Wakenaam and Leguan, whilst Tiger Island could be connected with Suddie. As everything centres in Georgetown all communications direct with town are necessary.

Whether this enlarged scheme will be practicable for a few years, remains to be seen : but that it is possible, I unhesitatingly affirm. So soon as New Amsterdam gets accustomed to the use of the Telephone, it is very certain that the cry which has already been raised for telephonic connection between that part and Georgetown, will have to be attended to. With such a system of telephony the colony would be well served, and call offices at various parts would largely benefit non-subscribers. This would lead to the idea that thereby the Telegraph would suffer; but the facts born of European experience do not support this. The extended use of the Telephone in other parts of the world, has not had a very material effect upon the telegrams sent. Whichever way it be, the Government, having both in its hands, will have the advantage of the new, whether the old order changeth or not.

Twenty Years' Improvements in Demerara Sugar Production.

By Seaforth M. Bellairs, Manager, Chateau Margot.

PART I.

IT has often been said that before beginning any discussion it is as well to define one's terms. Lest there should be any doubt as to the meaning of the word 'Improvements,' I may as well assert at once that I mean it only from the dollar and cents point of view, and shall only regard that as an improvement which enables the producer to turn out a ton of sugar at less cost; or to put it in few words, anything is an improvement that pays, no regard being had to science or art, philanthropy or comfort.

Sugar production may be, primarily, divided into two departments, which, although they are as a rule conducted by the same persons, are very distinct from each other. These departments are Agriculture and Manufacture, or 'Field and Buildings,' to use the planter's slang.

Let us begin by considering the 'Field' or agricultural department, and see what alterations have been made in the last twenty years, and then consider which are improvements.

In considering Agriculture we must carefully keep before our eyes our definition of the word 'improvements.' The object and end of agriculture is to land the

best and sweetest canes at the factory for the least possible expense during a long series of years.

It is not an interesting series of agricultural experiments; it is not a 'pretty cultivation,' nor necessarily a large return per acre, nor is it doing wonders for a crop or two, and then having an impoverished plantation.

We must remember that canes are only a means to an end. The end is money *via* sugar.

Rank unripe canes may look very pretty in the field, but they do not 'fill the manufacturer's eye' as they go up the cane-carrier. It is unnecessary to say much about a starved cultivation; the profits from such a system are so obviously declared out of 'Capital Account' that it cannot be seriously recommended, except perhaps on those exceptional estates which have so large an area of land that they may fallow their cultivation when exhausted, and let nature take time and renew its fertility.

During the last twenty years there has been very little improvement in agriculture from the cane point of view. I think that the colony grew nearly if not quite as many canes per acre, twenty years ago as it does now, but I imagine that there has been very great improvement from the sugar point of view, and enormous improvement from the money side of the question. The average cane juice of the colony is both purer and richer than it was, and this is attributable to many reasons.

First—The factories are, as a rule, much stronger than they were, and therefore the estates grind fewer weeks and can afford to hit the time when the canes are most fit to be cut, much better than used to be the case. The effect of this greater strength of the factory relative to

the cultivation, is particularly noticeable at the end of the year. Canes bloom or arrow about September, and we all know that the very best time for reaping is the time fixed by nature, and that is when the arrow begins to dry and fall off, which is generally in October or November.

I can remember the time when many estates used to *have* to begin grinding in August, when the arrow was in the cane, and the juice both poor and full of starches most deleterious to the manufacturer, which would have been converted by a few weeks of sun into sugar. There was generally a weak point in the evaporative appliances, and the pans, or something, used to go on from very small hours on Monday mornings, right through night, and day, till—till—well it must be said, right through till rather large hours on Sunday mornings; right through the best reaping time of the year, and on through the December rains, when the moisture would cause a second growth in the over-ripe canes, on and on till February or March. There were of course stoppages to 'clean up' to allow the megass to dry, and work off the accumulation of molasses. Often they had to stop, sorely against their will, in the dry weather, just at the most favourable time, on account of there being no water to fill the trenches of the navigation system.

Now-a-days, as a rule, the buildings are better balanced and a sharp, brisk grinding of six or eight weeks disposes of the canes which used to linger over four or five months.

Secondly—There is not such a mania as there used to be for big crops, we now think more of clearances and less of the size of the crops.

Twenty years ago very few planters kept a record of the money spent on each individual field, and many a field was worked up year after year, which helped up the quantity of sugar made, but brought down the clearances.

Of course we all know that land which it would pay to work when sugar was selling at 28/- per cwt., would be ruinous with sugar at 18/.

Again, I think that much more attention is paid to the internal drainage of the cultivation, and this affects the quality of the juice as much as it does the quantity. An old and experienced planter under whom I worked as an overseer, used often to say that 'drilling ought to be charged to the buildings,' and there is some truth in the remark.

Another thing that has greatly helped the cultivator is the enormous reduction in the price of fertilizers, especially in that of the best of all fertilizers, Sulphate of Ammonia.

There are three agricultural improvements which have not yet been satisfactorily carried out, but all planters are so alive to their importance that, I think, it will not be very long before the attendant difficulties are satisfactorily solved.

These are—Cutting canes on Mondays, Irrigation and Implemental Agriculture.

It seems a very strange thing that it is so very difficult to induce a Guianese agricultural labourer to do a fair day's work on a Monday. No difficulty is found in manning the factory, nor in employing tradesmen, but it is almost impossible to get the field labourer to work on Monday as well as he will willingly do on Thursday or

Friday. The negro labourer, or, as he is generally called the 'task gang' labourer, has also the greatest objection to taking up less than a full week's work; the consequence is, as is well-known, that the field of canes to be cut is only "marked" on a Monday; or, at the very most, the dam beds cut, the canes cut subsequently are carried out and piled on these few which were cut on the Monday, which consequently do not find their way to the factory till the Monday or Tuesday of the following week. As the cane cutters have to leave their work early on Saturday, so as to be present and receive their money at the estate's pay table, they cut very little on that day, the result is that the parapets of the fields are loaded on Friday nights with canes enough for at least two days' grinding. Apart from the risk of accident, it is obviously inadvisable to have so many cut canes on hand. They begin to deteriorate as soon as they are cut, and the rise of the percentage of glucose in the juice every Monday and Tuesday morning constantly calls the attention of the planter to the wastefulness of the present system.

Mr. Gilzean claims to have put a stop to this habitual Monday idling by his cutting canes by contract; if so, the steady supply of canes and the avoidance of any accumulation at the end of the week, are some of the strongest arguments in favour of his system.

The last two years have been so excessively wet, that the question of irrigation has been almost lost sight of, but wet years are not likely to recur for ever, and as soon as ever there is a drought the question of water conservancy and irrigation will again come to the fore.

These two questions are really only one, for it is plainly impossible to irrigate without water, and par-

tial irrigation is as bad as, or worse than, none at all. I mean partial as regards time. Our present supply is apt to run short just when it is most wanted—as SCOTT says, ‘Like a summer dried fountain when our need is the sorest.’ As soon as water fails, those fields that have been artificially watered suffer more than those that have had to depend on the natural supply. As long as there is the slightest fear of any stint in the supply, all ideas of pumping water from the navigation trenches for irrigation are out of the question. In fact the quantity required is so enormous, that no estate can irrigate if there is the slightest chance that its water supply may be put on ‘time runs.’ At present there are only a few estates which can, during a protracted spell of dry weather, rely on having more water than is required for navigation purposes. To ensure efficient irrigation, there is required a practically unlimited supply of water, conserved to so high a level that, with a system of sluices, any part of the cultivation can be, at any time, laid under water, as may be desired.

When one contemplates the enormous improvements in the water supply of the East and West Coasts of Demerara effected during the last twenty years,—for which we may chiefly thank the indomitable perseverance of the late Mr. WILLIAM RUSSELL,—it is not too much to expect that, in the near future, some of the exhaustless streams of our great rivers will be deflected, and instead of wasting their wealth in the barren ocean, their waters, conserved to the desired level, will be made to flow in fertilizing streams behind our sugar estates; and then irrigation will be a thing accomplished and droughts a thing of the past.

We now come to mechanical agriculture. During the last twenty years many efforts have been made to introduce steam cultivation. The great pioneer of sugar making in this colony, Mr. HOGG, invested a very large sum, and set up a complete arrangement at Plantation Cumming's Lodge, both for sub-soil drainage and also for steam cultivation. Nearly all our cane-fields are drained by open drainage, and as there is no mechanical plough known, that can be worked in open drained fields, a necessary preliminary to any system of mechanical agriculture is subsoil drainage, which has narrowed down to tile drainage.

With the exception of the Messrs. EWING'S estate *Vryheid's Lust*, this tile drainage has proved impracticable. There are many estates in this country on which every drop of water that falls from the skies has to be pumped, and the rainfall is, occasionally, so heavy that the most powerful pumps fail to maintain a current in the side lines. As the water ceases to flow in the tiles they immediately become silted up, and have to be cleared at enormous expense. Sometimes it is necessary to take them up, clean them and replace them.

The wettest day I can remember was the 29th December, 1881, when the rainfall on the West Coast was close on twelve inches (11.75). When it is considered that an inch of rain means, roughly, 100 tons of water per acre, it will easily be seen what an enormous body of water has to be got rid of during such a rainfall. If the estate depends on natural drainage the side lines would be sure to stagnate and when it is high water the kokers would have to be shut. If there is a pump it must be a very large one to dry the estate quickly. Un-

fortunately also the rainfall is very local—especially in the month of August, when a heavy thunder-storm may soak the front of an estate and no rain fall at all at the back; when this is the case the water in the side lines is sure to stagnate in certain places, and where it stagnates there is danger of the draining tiles becoming choked.

This is the reason, I think, why, hitherto, except at *Vryheid's Lust*, all attempts at mechanical agriculture have been abandoned. Should this difficulty be overcome, and steam cultivation be established, our sugar estates will be revolutionized, and the labour question satisfactorily solved. It is almost unnecessary to add that the cost of converting an estate from open drains to tile drains is enormous, about equal to the market value of the estate itself, and proprietors are naturally chary of investing so very large a sum of money, unless they see a very strong probability of financial success.

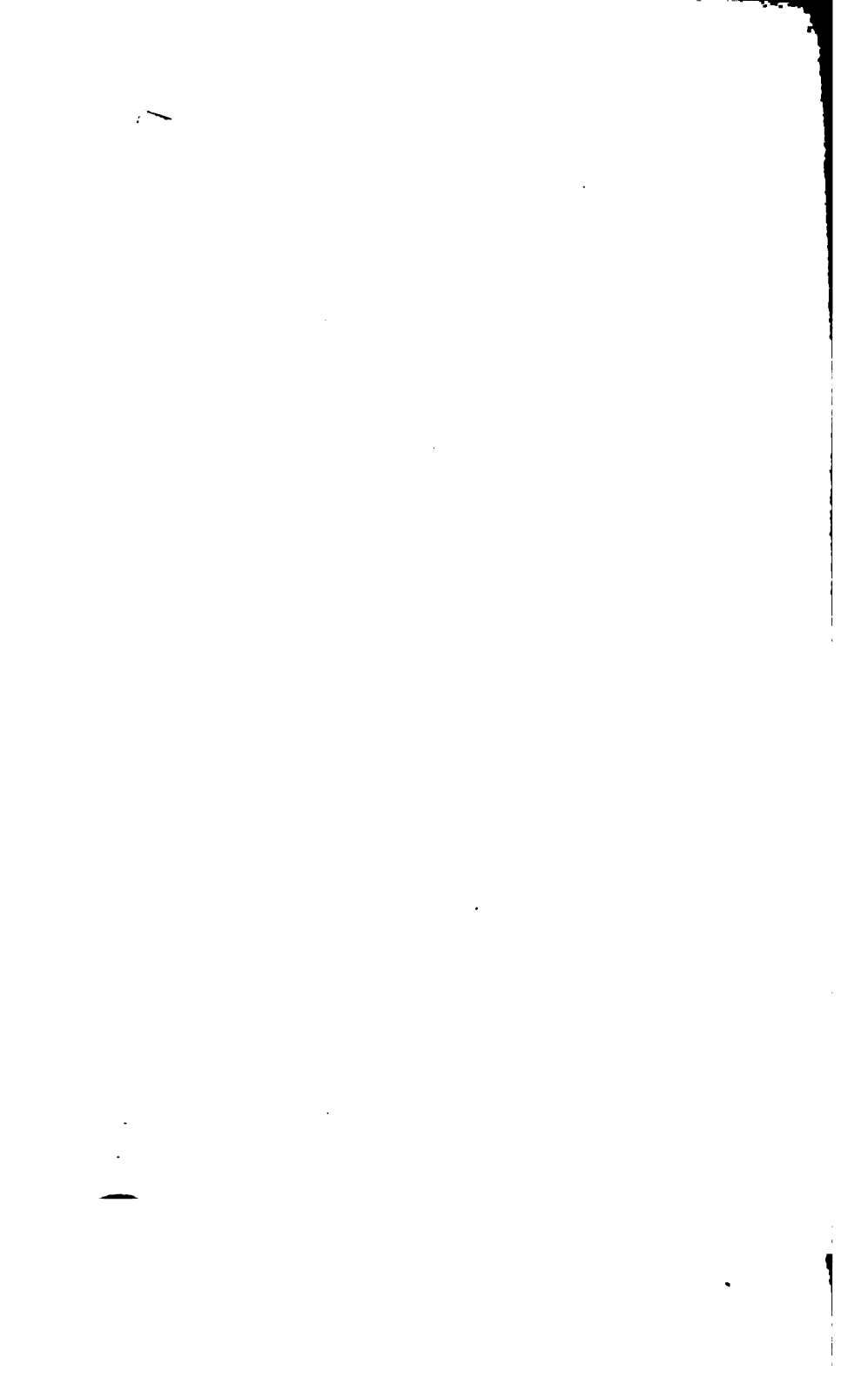
There is one more subject so closely connected with agriculture that it should be mentioned, but it is so undeveloped that no one yet knows what its potentialities are. I refer to the recent discovery that sugar cane can be raised from seed. The sugar growing community are not likely to neglect this most important discovery, especially when it is remembered that attention to seed and breed has done so much to enable the beet growers successfully to fight with cane sugar, and to drive down the price of sugar in the world's markets to scarcely remunerative rates.

To conclude this part of the subject, I am afraid that we must come to the conclusion that improvements in agriculture during the last twenty years have been

neither many nor startling. But on the other hand, we may reasonably hope that the next twenty years will have a different record. Time alone can tell what effects will be produced on the cane by the selection of the best seedlings. And when the great questions of irrigation and steam cultivation are satisfactorily solved, our crops will be less dependent on weather, and a labour supply, avowedly most unsatisfactory will be enormously increased by the aid of machinery.

information ; also what the power should be by the Formula (of
Average effective pressure is taken from Indicator Cards with a
power in Column K is in the ratio of Actual Roller Speed to 18 ft.

JUICE.				A curiosity in Sugar Mills.—At Pln. Versailles there was a sugar mill which had hardly ever been used and was pulled down in 1865, made by Pearson & Co., Liverpool, in 1856. It had a cylinder 20" diam. x 3.6" stroke gearing $\frac{86 \times 70}{16 \times 13} = 28.9 \therefore$ revs. of mill = 1.38 at 40 revs. of engine. Mill rollers 42" x 78". Roller speed = 15.18 ff. per minute. Horsepower to drive the mill at that speed = 158 I. H. P., so at 40 revs. per minute of engine there would be required an effective pressure of 93 lbs. per \square " or with 40 lbs. effective pressure, the engine would have to run at 90 revs. per minute.
ons of Juice expressed by Mill per	r.	per 100 galls, as by Mr. Cor-	's rule in Herstelling trial	
s. per hour	Result.	Result.	Result.	
per Gallon of Juice obtained	minute.	Result.	Result.	



Horse Power and Sugar Mills.

By Geo. Bagot Steele.

IN submitting a comparative table of Sugar Mills, and the horse-power to work the same, as I did at the November meeting of the Royal Agricultural and Commercial Society, I wish it to be understood that I did not do so with any view to say anything adverse to Mr. SKEKEL'S mill at Pln. *Herstelling*, or to criticize the figures of Mr. CORNISH: far from it; but it struck me that the horse-power to work the *Herstelling* mill was excessive; and after a conversation with a brother engineer, I looked up a number of notes and Indicator diagrams of various engines and mills that I had in my possession; the diagrams having with few exceptions been taken by myself from time to time. These form the basis of the array of figures which I submitted at the meeting on November 5th, and as was said at the time, I regretted that there were no engineers or planters present at that meeting, so that a discussion could have taken place; as it was, I was allowed, so to speak, to have simply "a walk over."

Since then, I have kindly had placed at my disposal, Indicator cards or diagrams of other engines and mills, as well as other information, by Messrs. LI. JONES and W. S. HERRIOT and another engineer; so that I have been able to make a much more extended table,* both as to the actual number and the various items of information, as below.

* The table is printed on a separate sheet.

These will, I trust, be of some interest to such of the readers of *Timehri* as are engineers and planters, and at any rate, I trust the table and its figures will be taken for what they may be worth.

Of course when we look at some of the engines, it will be seen that the percentage of actual over indicated horse-power is high, notably that of the second engine and mill quoted in the table; but then there must be taken into consideration the better results in the percentage of crushing, which of course runs the horse-power up at once. The late Mr. WM. RUSSELL laid it empirically that 3 o/o better extraction caused 10 to 15 o/o more horse-power to be exerted, and in that I think most practical men will agree. Mr. DOUGLAS gives the *Herstelling* trial as at 62.02 o/o of crushing; and the figures in the comparative table give the actual over the indicated horse-power at 46 o/o. On reference to the same it will be seen that in No. 2, the difference is even higher yet, being 54 o/o, but then on referring to the notes I have, this mill is crushing about 64.6 o/o, and in this instance Mr. SKEKEL'S mill has the advantage, No. 2 mill having 22½ cwt. per square inch on the hydraulic ram. In No. 4 again the excess of actual over I.H.P. is but 10 o/o, the ram being loaded to 25½ cwt. per square inch and percentage of crushing 66 o/o.

No. 13 gives only 7 o/o of excess of I.H.P., the ram 20 cwt. per square inch and the crushing 67 o/o.

I am unable to account for the difference apparent in No. 2, 4 and 13, which I did not tabulate as there were not enough of such percentages of crushing to be worth while collecting.

I think it would be worth while to some engineer who

has engines and mills doing double crushing, in his care, if he were to go into the question of the horse-powers &c., exerted in double crushing and then compare these matters of single and double crushing and the I. H. Power of the same, with Mr. NEVILE LUBBOCK'S paper in the October number of the *Sugar Cane*.

Report of the Meetings of the Society.

Meeting held on the 14th May.—Dr. J. W. Carrington, C.M.G., Vice-President, in the chair.

There were 31 members present.

Elections.—*Member* : Revd. W. H. Nash.

Associates : Messrs. John Bentley, Tom Slater, Ignatius F. King, James Richard Wharton, and Richard Albert Hill.

The following report of the Commercial Committee on the matter of Mr. Krogh's communication, which had been referred to them at the last meeting, was read and ordered to be forwarded to the Chamber of Commerce for their information. The Assistant Secretary reported that the samples therein referred to had not yet arrived, but when this took place, they would be placed in the Exchange Room for inspection :—

"That having consulted with Mr. Krogh and read his communication to the Society, the Committee desire to express their hearty sympathy with him in his endeavours to open up fuller trade relations between this Colony and Venezuela, and are glad to hear from him that he is in communication with his Government to that end. They consider that this object will be best promoted by consignments to the leading merchants of this Colony, and that Mr. Krogh deserves the thanks of the community for importing samples of the products of Venezuela, which they recommend to be exhibited in the Exchange Room. They also think that the high duty on cattle imported into this Colony should be considered in anticipation of the next Customs Ordinance with a view to its reduction."

The annual list of members in arrear was laid on the table; in accordance with the bye-laws, their names would be struck off the roll, and the list posted in the Reading Room.

Some discussion took place as to members in arrear being excluded from the use of the Reading Rooms and Library from the 1st of March, in accordance with bye-law chap. vii, Sec. 1, the Chairman remarking that the rule should be enforced, in which several of the members agreed.

Mr. Bayley thought it would be a great boon to Associates, if the subscriptions were payable half-yearly, and at the suggestion of the Chairman gave notice of motion as follows :—

"I give notice, that at the next meeting I shall move that the subscriptions to the Society be collectable in January and July of each year in advance, the bye-laws to be altered accordingly."

The following report of the Committee appointed at the previous meeting to consider the question of opening the Reading Rooms at night, was then read :—

It was recommended, that it is desirable the Reading Rooms be opened in the evening for two hours, either from 7.30 to 9.30, or from 8 to 10, on every day of the week except Sundays, holidays, and the evenings when lectures are given.

That the most suitable place to be opened in the evening is the East gallery, which alone should be well lighted. The entrance should be by the Museum staircase, which must be provided with at least one light. That two chess-boards and sets of men be provided, together with the same number of draught-boards and sets of men.

That reasonable compensation be provided for an attendant for the evening.

That it is not desirable that books be issued in the evening, or that smoking should be allowed.

The Rev. W. B. Ritchie moved and Captain White seconded, that the report be adopted, which, after a slight discussion was agreed to, the Directors being left to carry out the recommendations.

The Chairman called attention to the fact that the rule No. 15, allowed periodicals to be lent out for the

evening from off the tables, and might cause some inconvenience when the Rooms were open in the evening. This led to some further discussion, in the course of which a doubt was expressed as to the Report having been adopted, and the matter was therefore put to the vote, with the result that the motion was carried by twelve against three, several members remaining neutral.

The following notices of motion in this connection were then given :—

By Mr. Watt—"That three months hence I shall move that the Directors be respectfully asked to reconsider the report of the Committee on the opening of the Reading Rooms at night, in so far as to arrange for throwing open the Reading Rooms proper, on week nights, instead of only a small and inconveniently situated portion thereof."

By Mr. Æneas D. Mackay—"That at the next Meeting, I shall move, that Rule 15, Schedule C, which allows Periodicals to be taken out between the hours of 6 p.m. and 7 a.m. be struck out of the Society's bye-laws."

Mr. Mackay then brought forward his motion that the Museum be opened on Sundays from 3 to 5 p.m., which he introduced with a few remarks on the educational value of a Museum. This having been seconded by Mr. Jacob Conrad, Mr. Quelch, the Curator, stated that he had no objection to the proposal, but was decidedly in favour of it; he, indeed, having originally suggested it. Messrs. Gibson, Vyle and Turner and the Revd. Canon Moulder supported the motion and Major Walthall suggested that the words "in view of the educational value of a Museum" be struck out. This having been agreed to the motion was altered to read as follows and carried:—

"That the Society's Museum be opened from 3 to 5 on Sunday afternoons, and that the Committee of Correspondence be requested to give effect to this motion,"

Mr. Conrad's motion for the establishment of an Agricultural College, was by consent, postponed until the next meeting.

Mr. Rockcliffe read a paper* on Engine management, for which the thanks of the meeting were accorded, and discussion thereon postponed to the next meeting.

Mr. C. Montague Jones read a paper† on the Port of Georgetown, for which he also received a vote of thanks, its discussion being left over.

A letter from Mr. Hawtayne was read, in which he called attention to an article in the Journal of Anatomy and Physiology, (which was forwarded) on the Pharmacology of Curare and its Alkaloids. The Chairman suggested that the description of *Strychnos toxifera*, specimens of which were in great request, should be published, so that gold-diggers might know the plant when they come across it, and forward samples to Mr. Quelch.

Captain White informed the meeting that he had received a letter by the mail, from which it appeared certain that the Boston Fruit Company would come to Demerara and open up the Banana trade.

Mr. W. T. Binnie laid over a comparative statement of agricultural products entered into the Stabroek Market during the first three months of 1890 and 1891, for which the thanks of the meeting were also accorded.

The thanks of the Society were directed to be forwarded to Mr. A. C. L. Campbell for a donation of some original MS., papers, &c., in connection with the foundation of the Society in 1844. They included the proposals

* Printed on page 221.—ED.

† Printed on page 230.—ED.

for establishing a Society, to be called "The Guiana Agricultural and Commercial Society." and the "Draft Prospectus of the Agricultural and Commercial Society of British Guiana. 16th January, 1844," as well as a printer's proof of the first document and two other printed papers, which were ordered to be preserved among the Records of the Society.

The Secretary reported that he had applied to the different West Indian Governments for copies of their Blue Books and in reply had received four, from Trinidad, Grenada, Leeward Islands and British Honduras, for which the thanks of the Society were also directed to be forwarded.

The meeting then terminated.

Meeting held on the 11th June.—Hon. B. Howell Jones, President, in the chair.

There were 32 members present.

Elections.—Members: Messrs. John Gonsalves D'Aguiar, and W. W. Kenrick.

Associates: Messrs. R. J. Simons, Geo. Horner, William Jacobs, and Thos. H. Dalgleish.

On behalf of the Directors, the Chairman reported that Messrs. E. C. Luard and Thos. Daly had been elected Ordinary Directors in the room of Mr. Jos. Monkhouse, resigned, and Mr. S. M. Bellairs, who had left the colony.

The Chairman also reported, on behalf of the Imperial Institute Committee, that the name of the Honourable Sir Arthur Hamilton Gordon, G.C.M.G. had been submitted to H.R.H. the Prince of Wales, as repre-

sentative on the governing body of the Institute, of British Guiana and Trinidad.

In the matter of Mr. Jacob Conrad's motion for petitioning the Government to establish an Agricultural College, the mover said that, in view of the other business before the meeting, he would with their consent postpone it till next month. This having been agreed to, the motion was accordingly left over.

Mr. B. S. Bayley then brought forward his motion that subscriptions to the Society be payable half-yearly. This he considered would be a boon to young men with small salaries, who found it difficult to raise the amount at one time. He did not think it would be any loss to the Society, and hoped that the members present would not allow his motion to share the fate of a similar one which was brought forward by Mr. Darnell Davis two or three years ago. Mr. Vyle having seconded the motion Dr. Carrington objected to its wording, as not being in order according By-Law Chap. xv. Sec 1, which provides that the By-Law to be altered and the exact words of any proposed new By-Law shall be clearly specified in the notice of motion. The Chairman said he would be compelled to rule that the motion was out of order, but Mr. Bayley could give another notice of motion in compliance with the rules. Mr. Bayley therefore withdrew the motion, and stated that he would bring it forward again in accordance with the By-Law.

Mr. Æneas D. Mackay withdrew his motion for rescinding rule 15, schedule C, which allows periodicals to be lent for the evening.

The Chairman having stated that Mr. Montague Jones's

paper on the Port of Georgetown was open for discussion :—

Mr. Darnell Davis said that one point in Mr. Jones's paper deserved attention, and that was the desirability of a river wall, and as Mr. Bayley, who advocated the erection of such a work when in the Combined Court some years ago, was present, he hoped that the matter would be discussed. He thought however that before anything could be done, they would have to get a body like the Commissioners of the Port so well known in England. If such a body existed here, with full powers, not only to propose, but to carry out measures of this sort, the river wall would probably be built.

Mr. F. A. R. Winter said that at the time when Mr. Bayley was pressing forward the matter public opinion was roused on the subject, but he doubted whether sufficient interest could now be again awakened. He had been strongly in favour of the river wall because it would tend to improve the sanitary condition of Water St., by causing a strong current to sweep away the filth that now accumulates under the stellings. Whether it would be worth while to revive the project, he did not know.

Mr. Bayley said it was so long since he had given any thought to the matter, that he could say little about it now, although he had taken great interest in it when it was before the legislature. He had then considered it practicable and had formulated a scheme by which the cost would be repayable in fifty years. Circumstances had however considerably altered since that time, as steamers now come alongside the wharves and did not incur the expense of lighterage, which made an item in

his calculations. It would have been a great boon to the city if it had been carried out, but the project was overthrown by the Colonial Civil Engineer's estimate of three million dollars for filling up the wall behind. He did not believe that it would cost anything like that, as the tide could be utilised to help in silting up, he having himself had experience of this.

Captain Jones spoke of the epidemic of 1866, when by moving a vessel away from the vicinity of the stellings, the sickness was abated. The neighbourhood of the market, he considered to be still in a most filthy condition.

The Chairman said his opinion, which coincided with that of many of the merchants, was that the project would entail very great expense. It would also cause very great inconvenience while in course of erection, which would last for something like ten years. The cost would be much greater than most people imagined ; it would not be easy to put down a dam along the whole river front of the town and then build a wall behind it to resist external and internal pressure. They could not increase the port charges as these were already considered too high. He would like to see something of the kind, and thought that perhaps as the city grew a canal might be led through it, where ships could discharge their cargoes as at Bristol.

Major Walthall said he did not agree with the statements which had been made that the port was unhealthy. During the last three years there had been generally an average of sixty or seventy American seamen in the river, who stayed from one week up to three months, and yet in all that time only four deaths had occurred.

One of these seamen died by accident, and the other three of consumption, disease of the brain, and Bright's disease. Those were all the deaths among men exposed to the malarial influences of the climate, who did not take care of themselves, and who were exposed to the pestiferous emanations from under the wharves. Not one had died of any disease peculiar to the colony; he therefore had come to the conclusion that Georgetown was one of the healthiest ports in the world.

Mr. Kenrick read a paper* on "Opening up the Colony," the Chairman remarking that he had much pleasure in introducing him as a new member who had come forward on the day of his election to read a paper.

Mr. Jacob Conrad moved a vote of thanks to Mr. Kenrick for his interesting paper, which he considered to be one of the most valuable ever read before the Society.

Mr. Darnell Davis spoke as to the possibility of Europeans being able to settle in the interior. If white men could settle in the interior, European capitalists would be ready to advance money to enable them to do so.

Mr. Winter questioned whether it would be economical to make roads for ox or mule carts, as they would have to carry their own fodder, which for a long journey would be a load of itself. He thought, therefore, that a railway would be better in every respect. This should be the principal means of communication, from which branch roads for carts could be made.

Dr. Carrington spoke of the work of the Commission now sitting to take evidence and report on the same matter, of which he was a member. He agreed in some

* Printed on page 237.—ED.

things with Mr. Kenrick, and like him was surprised to find that although the British nation had been in possession of the colony for about ninety years, nothing more than a narrow fringe of sea coast was in cultivation. The Commissioners had been much struck, in their late tour in the interior, with the magnificence of the water-ways, especially the Essequibo, which, barring the rapids, was navigable up to the Potaro for steamers of light draught. It was depressing to see such a splendid river, compared with which the Thames was a mere ditch, and to find not a single habitation from the falls to the Potaro. Even the few Indians, who formerly lived there, have abandoned their settlements on account of the gold-diggers. There could be no doubt that the colony owed a great deal to the sugar industry, but, at the same time, they could not disguise from themselves that they had an immense area of country in the interior, most of which was valuable for cultivation. There were fine savannahs and uplands, where the soil was good and the climate mild and beneficent, and where, whether Europeans could work or not, labour could be carried on under satisfactory conditions. Those lands were far away, and the question was how to bring them into approximation to the present market. Mr. Kenrick had made some suggestions, whether they would be practicable or involve too great an expenditure, remained to be considered. They would, however, all agree that Mr. Kenrick deserved their gratitude for dealing in so able a manner with a question of such great importance.

The Chairman said Mr. Kenrick's paper contained a great many ideas, and some of them, he was sorry to say, not new, which had been found impracticable.

The first settlements of the Dutch were in the interior, but it was found that the coast lands were more fertile ; that was the reason why the seaboard had received the most attention. When he went past Hog Island in the Essequibo, knowing it to be one of the most productive pieces of land in the colony,—in daily communication with Georgetown—he sometimes asked himself, why did not some of those gentlemen who talked of opening up the country, take that island, invest their money in it, and introduce persons to cultivate it. If railways and roads were to be carried into the distant parts of the colony, where was the money to come from, and where were the people to inhabit the land? He maintained that capital was to be first provided, and then labour. These must be brought into the country, and he hoped they would be introduced by means of the development of the mineral industry. He would ask the meeting to postpone the discussion, so that the paper might be read carefully.

Mr. Daly suggested that a special meeting be called to renew the discussion of the paper, which being agreed to, it was postponed until the ensuing Thursday afternoon.

A hearty vote of thanks was then accorded to Mr. Kenrick, who stated that he should be happy to answer the queries and criticisms on his paper on another occasion.

The thanks of the Society were accorded for the following donations:—

To the Library.—

From the Government of Barbados.—Geological Map and Pamphlet explaining the same.

To the Museum.—

From B. V. Abraham, Junr.	...	33	Postage Stamps.
„ F. das Neves e Mello...	...	28	„ „
„ Dr. F. H. Anderson ...	...	15	„ „
„ Captain G. H. Arnott ...	...	3	„ „
„ Robt. Kaufmann ...	...	2	Diamonds, and samples of clay, gravel and con- glomerate in which they are found.
„ „ „	...	2	pieces gold-bearing quartz.
„ Quintin Hogg... ..	...	5	Australian, 3 Brazilian, and 3 Cape Diamonds.
„ J. W. Johnson—A unique Stone Implement (described on page 175, June 1891) found below the surface at the Sand Hills.			

Mr. Quelch having explained the peculiarities of the last specimen, the meeting then terminated.

First Adjourned Meeting held on the 25th June.—
Hon. B. Howell Jones, President, in the chair.

There were 38 members present.

The Chairman having stated that they were met together in accordance with a resolution of the last general meeting for the purpose of continuing the discussion of Mr. Kenrick's paper :

Mr. A. Weber said he had taken a great interest in Mr. Kenrick's paper, and the criticisms and remarks made upon it, as reported in the newspapers. The question was a very wide and difficult one, and impossible to consider fully at the present meeting, but he would make a few remarks. Mr. Kenrick had charged them with apathy in not having opened up and developed the country before; in a certain manner he was right. It was only lately that the resources of the interior had been discovered. Gold had led to a rush, and he thought

Mr. Kenrick would agree with him that there had been no lack of private enterprise in that direction. The Government on the contrary, had done little or nothing. So far as the interior was concerned they only knew that there was plenty of gold and nothing of the other resources. Private enterprise should be backed by Government assistance. Wherever the gold-diggers went, the Government should follow them. If this were done, immigration would follow, not necessarily of Englishmen, but there were plenty of Italians and Chinese ready to go anywhere, if inducements were offered. He himself would like to spend a holiday at the Tumatumari falls, but at present it would cost him as much, and take as much time, as a trip to London, besides which the dangers of the journey were greater.

Mr. Daly spoke in favour of Mr. Kenrick's suggestions with regard to a road. The pastures of the interior were (he said) the same as those on which the Venezuelan cattle imported here were raised, and he did not see why we should not rear them ourselves on our own savannahs.

Mr. Winter speaking of the fine stretch of country in the interior, pointed out the dangers of the passage and the difficulty of the journey. A great number of lives had been lost in the rapids, while the long exposure caused a great deal of sickness among the labourers. It had been asked why nobody cultivated Hog Island. The reason was that the cost of drainage stood in the way. It was no use talking about immigration as long as the country remained as at present. The interior must be made accessible before people would come here for gold mining or cattle farming.

Mr. Hargreaves called attention to the fact that European colonization had been tried in French Guiana and Venezuela, and in both countries with disastrous results. The malarial fevers from which the settlers suffered had been attributed to the turning over of new ground, and it was thought that if native labourers could be got to do the pioneer work, Europeans could then settle without risk.

Mr. Winter said that there were a great number of Portuguese in the colony already, who he presumed might be considered as Europeans, and they found no difficulty in labouring on their farms and provision grounds.

By consent of the meeting, the Assistant Secretary was asked by the Chairman to inform them as to the first settlement of the colony.

In reply Mr. Rodway said that up to the time of Gravesande the colony of Essequibo consisted of about thirty plantations of little importance in the neighbourhood of Fort Kyk-over-al. By permission of the West India Company the river was opened to all nations, with the inducements of free land and ten years freedom from taxes for all new settlers. This having been noised abroad throughout the West Indies, it followed that a considerable number of planters from Barbados, Antigua, St. Kitts and other English islands, came to Essequibo and received concessions. So great was the influx of settlers that, whereas in 1740 hardly a plantation existed near the mouth of the river, five years later, all the best land was taken up, and grants in the Demerara river were applied for. The first settlers in Demerara established their plantations in the

upper part of the river, because there was neither fort nor other protection from an enemy, but, on account of the soil becoming so soon exhausted, they were obliged to come down to the coast. Whereas in the upper district crops were very poor after two or three years, and almost worthless in about five, near the coast the sugar canes could be grown continuously without any difficulty. Neither Demerara nor Berbice enjoyed any measure of prosperity until they began to cultivate the line of coast.

Mr. Perkins spoke of the temperature of the savannah region, which he said ranged from 56° to 61° at night and 72° to 86° in the day. He also read some extracts from Mr. im Thurn's "Among the Indians of Guiana," where the savannahs are described.

Mr. Vyle thought the question of temperature a very important one. As a British colony it was desirable that British emigrants should settle here, but it would never do to invite them until it had been proved that the climate was suitable. If the Government would only do this and offer free grants of land, he thought that labour to develop the colony would not be wanting.

Mr. Cunningham said the first thing necessary was to save the lives of the gold diggers, who were now subject to the dangers of the rapids. To effect this, all that was wanted was a light railway from Bartica to the centre of the gold district. This would not cost more than about £1,500 per mile, and when opened it would soon tell on Bartica and lead to developments in gold mining and afterwards in agriculture.

Mr. Farnum rose to move a resolution, but, on the request of the Chairman, left it over until the discussion should be finished. He did not think the colony could

entertain any scheme that would cost millions of dollars, but what was wanted, was a beginning, the results of which if encouraging would lead to further enterprises.

Mr. Jacob Conrad referred to the failures in attempting to get coolies to settle in the colony, instead of insisting upon their back passage. He thought gold-mining should be free from all restrictions and any tax that might be imposed should be payable on exportation. He advocated the construction of roads, but thought it would be well to give the matter due consideration even if they had to wait a little.

Mr. Hutson hoped that something practical would result from the labours of the Commission which had been appointed to consider the matter under discussion. As to the interior, what Mr. Perkins had said seemed to show that it would probably be healthy, but this remained to be proved. He regretted to see that so few planters were present, but he supposed that the present rush of labourers to the gold-fields must tend to produce unfavourable opinions in their minds on this matter. He hoped that the resolution to be moved later would prove a stimulus to the Government to put forward all their energies, first, towards the saving of life, and second, towards developing the colony's resources in view of future contingencies.

Mr. Wood Davis spoke in favour of a railway from Bartica to a point beyond the falls, and read a resolution, which he wished to move to that effect, but, on the suggestion of the Chairman, this was left over until the end of the discussion.

Mr. Kaufmann referred to the difficulty in visiting the interior. If a light railway were constructed, many

persons would be able to visit their placers, and see what was going on, and perhaps in many cases save themselves from heavy losses. For himself he should certainly take advantage of such a means of communication so as to look after his own interests, while gentlemen like Mr. Weber would be able to spend their holidays in the interior with much less cost and loss of time than a trip to London. With the railway from Bartica to the Potaro, settlements would arise at different points, the present difficulties would be overcome, gold digging placed on a safe basis, and experience gained towards opening up other districts.

Mr. Farnum moved his resolution, which was seconded by Mr. Jacob Conrad.

The Chairman said that as it was now late he proposed to leave the discussion of the resolutions to another afternoon. With the consent of the meeting it was therefore adjourned until the Thursday following, at 3.30 p.m.

The meeting then terminated.

Second Adjourned Meeting held on the 2nd July.—
Hon. B. Howell Jones, President, in the chair.

There were 27 members present.

The Chairman having invited the members to continue the discussion on Mr. Kenrick's paper:—

Mr. Darnell Davis said that so far it had only been proposed to open up the interior, but it appeared to him that something more than that was wanted and this was a large scheme of immigration. The planters must naturally feel a little anxious when they see so many

labourers going off to the gold fields, and if this is the case at present, what will it be when the facilities are greater. Everyone he was sure would like to see the sugar industry flourishing, and he thought those who had brought forward the resolutions would be ready to add a clause to the effect that they would also like to see the population vastly increased both by coolie and other immigration. They did not want the gold industry to oust out sugar, but rather to be an addition to that industry. With regard to the interior they must not confuse the banks of the rivers with the savannah region, which is described by Hancock, Schomburgk and others as so very healthy.

Mr. Æneas Mackay spoke of the salubrity and comparative low temperature of the savannahs and mountains, as compared with the coasts and forests. If the Government would only guarantee the interest there would be no difficulty in raising money for a good scheme. The increased gold royalty alone would pay for the work. He thought that everything possible should be done to open up the country, and that then they ought to make it known to the world.

Major Walthall said he thought that the difficulties in the way of opening up communication with the interior had been very much exaggerated. As far as he could learn these were nothing like what had been overcome in other countries. He had seen the railway between Mobile and New Orleans which was built on piles through a swamp, and was now one of the most solid structures in the world. At first sight it did not appear that such a railway would pay, but nevertheless it was now the medium of an enormous amount of traffic. In

the United States the money for most of the greatest enterprises came from British capitalists, and it appeared to him that British Guiana ought to be able to obtain as much as she wanted on even better terms than a foreign country.

Captain White thought the difficulties referred to were more imaginary than real, and hoped the present discussion would lead to some practical result, as he was afraid they had too much theory in Demerara. The matter was not going to end there for the people were determined to have a road. Money could be easily got and the Government knew it. A great deal had been said about apathy and indifference, but there was one section of the community that had pluck and energy, and that was the planting body. He had never seen a more splendid combination of men, and he maintained that they showed the greatest energy in fighting the beet industry. Why should not the other sections be energetic and combine in the same way? What were they going to do with the twenty thousand children in the city? They could not all be clerks. Something must be done, or things would go from bad to worse.

Mr. Kenrick thanked the meeting for the attention they had paid to his paper and said he had listened carefully to the various addresses and criticisms on the three different occasions when it was under consideration. It was very gratifying to him to see such a consensus of opinion in general accord with his views, and he had observed that all were agreed as to the urgent necessity of being up and doing. The sugar industry had now to reckon with factors never dreamed of in past times, and signs were not wanting that showed severe and

keen competition to be setting in. If this continued much longer, what would become of Demerara? For some time past property throughout the colony had been depreciating, purchasers were few and far between, and a seller would be lucky if he got thirty per cent of its value of ten years ago. Efforts would have to be made to dispel the cloud by the active development of the natural resources within their reach. He advocated the making of a road as being the easiest, but a railway, if they had anything to carry on it, would be better. Besides, once have the road and a railway could be laid on it without difficulty. With a road to any central point, any one might go to the diggings, while as it is now only a capitalist could do so. Again, families could settle near the diggings and there would no longer be the difficulty of taking labourers up, and bringing them back again. With the road, which could be made in a few months by convicts, settlements would quickly spring up at intervals. He would suggest that a few practical men should be appointed to visit the district and report on what could be done, towards whose expenses he would willingly contribute. Anyhow, he hoped something practical would come out of the present discussion.

The Chairman in reviewing the discussion said that no one in the colony had taken more interest than himself in what had been termed "Opening up the Country." He had not travelled into the regions of the savannahs lying on the borders of Brazil and Venezuela, but he had traversed a good section of the colony from one to two hundred miles from the coast, and this district should also be considered in any scheme for opening up the country. As he had said before, capital and labour were

required before anything of consequence could be done. He had no doubt that capital could be easily obtained, but on account of the depressed state of the sugar industry, the planters were naturally disinclined to do anything that would lead to increased taxation. Far from being apathetic or opposed to this project for developing the colony, the planters were, as much as any other class, interested in the gold industry, and had invested large sums in it. As Captain White had said, the planters had shown a great deal of energy in their own profession, and he had no doubt they would be equally energetic in the gold industry. They could not compare this colony with Natal and Queensland; in the former colony there was a large native population, ready to grow provisions if sufficient inducements were offered. Here it was different; from Cartabo or Bartica to any point in the interior, they had to traverse dense forests almost without an inhabitant. There were no natural difficulties of importance in making a railway, neither would there be in obtaining the necessary capital, but to open up a country seven hundred miles in depth would require a great number of people and these could only be obtained by immigration. It was necessary to consider this as it was a very important side of the question. Again, he thought the government perfectly justified in not rushing into and approving any particular scheme without careful consideration. Two years ago a petition had been presented to the Court praying for a road from Cartabo to the Puruni; every one now would admit that such a road would have been a mistake. Now they wanted one from Bartica to the Potaro. He was in favour of this as he thought it likely to remain a gold

district for many years to come. It had been said that the Government had done nothing for the gold industry but draw the royalty. He did not agree with this, they had presented them with Mr. Kenrick, and Mr. Kenrick had given them a very valuable paper. In regard to the Commission on the same matter, of which he was a member, he could not divulge its secrets, but they might be certain that it would do its duty. He agreed with Mr. Kenrick that a road might be made first, and then the Government should do everything possible to induce persons to go there and settle. Let any man who would take up a piece of land, fence it, and cultivate it for five years, have it granted to him as a freehold. He would oppose any scheme for giving capitalists large tracts, and allowing them to remain in England and America, waiting until the land became valuable. He wanted to see settlers, and it was absurd that they should have to pay a dollar an acre for what was lying absolutely waste. As to a township near the Potaro, he should like to see one at the foot of the Tumatumari Falls, or at the mouth of the Potaro itself. The land might be lotted and given out at cheap rates so as to allow gold diggers to settle with their wives and families near the workings. Shops would soon spring up and there would be no longer the necessity for returning to Georgetown at such short intervals as at present. A great deal had been said about the loss of life. No one deplored this more than he did, but it must be remembered that pioneers in every country have had to encounter dangers at the beginning, in some cases much greater than those of this colony. It had been said that some of the dangers of the falls could be obviated by licensing the bowmen

and steermen. He had no doubt that something might be done in that way, but the safety of the boat did not entirely depend on them. He had seen an accident occur through the paddlers not working, while another case where five men were drowned, was simply caused by the foolishness of two men in trying to shoot falls which were known to be impassable. He did not know that any legislative measures could prevent foolhardiness. Even when roads were made he had no doubt some men would still risk their lives in shooting the falls. In conclusion he would only say that Mr. Kenrick had given them the opportunity of discussing the question of opening up the country, which they would all agree was desirable. Two resolutions had been laid before the meeting the one by Mr. Farnum and the other by Mr. Wood Davis. That of Mr. Farnum, being more general in its terms, he thought should be considered as a motion, while that of Mr. Davis might be taken as an amendment. The motion would then run as follows :—

“That this meeting of members of the Royal Agricultural and Commercial Society, being fully impressed with the great importance of the matters brought before it in the paper read by Mr. Kenrick, cannot separate without placing on record, formally, its appreciation of the manner in which the question of opening up the country has been dealt with by Mr. Kenrick, and expressing its entire concurrence with him in the absolute and immediate necessity for creating convenient, safe, and rapid communication with the interior country lying beyond the auriferous regions of the colony, in passing through which its real value may be thoroughly ascertained and made subservient to the far more important object of colonising, cultivating, and developing the dormant wealth of the undeveloped portion of the continent which we occupy.”

The amendment would read :—

“That this meeting is of opinion that the first thing necessary to opening up the country, is the acceleration of the present communica-

tion with Bartica, and the construction of a light railway connecting Bartica with the top of the falls."

Mr. Wood Davis then asked permission to withdraw his amendment, which being allowed, he seconded the motion, which was carried unanimously, the Chairman promising that it should be forwarded to the proper authorities.

Mr. Kenrick proposed, and Mr. F. A. R. Winter seconded a vote of thanks to the Chairman for his able conduct in the Chair during the discussion, which was carried unanimously.

The meeting then terminated.

Meeting held on the 9th July.—Hon. B. Howell Jones, President, in the chair.

There were 18 members present.

Elections.—Members: Dr. A. C. Jackson, Dr. P. Carroll, Lt.-Col. McInniss, Messrs. J. B. Sharples, S. Bourke, E. W. Gaskin and C. S. Davis.

Associates: Messrs. E. R. D. Moulder, J. J. May, L. G. Langmore, J. M. Castro, Jose Fernandes, Manoel Gomes, W. B. Gray, Albert Delph, E. Bratt, J. A. Atkins, J. L. Black, S. J. Edmonstone, and W. C. Van Eeden.

The Assistant Secretary read a communication from the Government to the President, acknowledging the receipt of a copy of the resolution relative to the opening up of the country and informing him that it would be duly laid before the Lieutenant-Governor.

Mr. Bayley said that, in view of the early departure of Major Walthall for the United States, he would like to ask if the Society could not arrange with him to com-

municate with them as to the probability of a system of immigration being established between this colony and the Southern States.

The Chairman in reply said the matter was one which could be best dealt with by the Directors, and he would bring it before them at their first meeting.

Mr. Jacob Conrad then brought forward his motion, of which due notice had been given, that the Society appoint a Committee to petition the Government to establish and maintain an Agricultural School or College. Mr. Conrad said that everyone connected with agriculture must have some knowledge of what the soil would produce, and he had thought for some years past that a school where this could be learnt was much wanted in the colony. Beyond the sugar plantations, agriculture was looked on here with contempt. They might talk of gold, but what was the use of gold without food? As an amateur, he had cultivated a number of vegetables with very good results, and if the people were taught how to do the same it would be to the advantage of everybody. The sugar planters had been very energetic in decreasing the cost and increasing the yield of their staple, but otherwise things were at a stand-still. If they had not done so they would have been unable to stand against beet. They had been progressive as appeared from a report of the Colonial Company, where it was stated that the cost of making a ton of sugar in 1879 was £22 2 0, in 1885 it could be produced for £10 14 0. This was the result of agricultural and mechanical improvements. The speaker then gave a number of statistics, showing that large quantities of food substances are imported that could easily be grown

in the colony with advantage. The United States, he said, could supply the world with the produce of her soil notwithstanding that wages were higher there than in other countries. This fact he attributed to the perfection of her agricultural schools, and he did not see why the colony could not do something towards supplying her own market at least.

Mr. Vyle seconded the motion, saying that the absence of so many little necessities and luxuries for the table showed the want of such an institution.

Mr. Darnell Davis thought it desirable that the subject should be discussed, but could not see how anything practical would come out of it unless some kind philanthropist found the money. Agricultural Colleges were very expensive, and he did not think the Government could be asked to do anything as it would mean the imposition of additional taxes. He thought that every sugar plantation in the colony was really an agricultural school.

Mr. Luke Hill thought the government might promote the object in view by encouraging technical education, to include agriculture in schools, or something might be done at the Botanical Gardens, but a proper agricultural College, he thought beyond the resources of the colony.

The Chairman thought the suggestion of Mr. Conrad quite impracticable. He knew something of the cost of Agricultural Colleges, which he considered quite beyond the means of the colony. Mr. Hill's suggestion was a good one, and the present head of the Educational Department was desirous of introducing technical education into the schools. He was quite certain that the Government would not entertain such an expensive institution

as the College, at the present moment. Mr. Conrad had spoken as if kitchen gardening were unknown, but such was not the case, as might be seen by anyone passing along by the railway, where the beds showed a very high state of cultivation. On an estate about two miles from town, some Portuguese cultivated provisions in a way that would be creditable in any country in the world. Unfortunately they sometimes had to contend with heavy rains which swamped the land and destroyed almost everything. On the plantation referred to there were last year two hundred and sixty acres in provisions, but owing to the deluge these had been reduced to only sixty one.

Professor Harrison said that he had recommended something to the Government in connection with Agricultural Chemistry, which would only cost about £150.

Mr. Conrad in reply said he hardly expected that the motion would be carried but he thought the matter a very important one, and that the Agricultural College ought to be established regardless of cost.

On being put to the meeting, the motion was lost by a majority of five against four, several members declining to vote.

Mr. van der Vlies' paper* on the Sea Defences in British Guiana, was taken as read, and ordered to be brought up at the next meeting, the newspapers being meanwhile asked to publish it.

A communication from a mercantile firm to Canon Castell, was at his request read and taken for notification. The writer assumed that Sisal Hemp was cultivated in the colony, and offered to sell it on commission.

* Printed on page 249.—ED.

Mr. Conrad spoke of the development of the fibre trade in the Bahamas, and thought that something could be done here.

The Chairman stated that it had been tried and proved a failure. He himself had joined a Company in London, who sent out machinery, some of which was now lying useless. Speaking from practical experience he did not think any one in the colony would touch it. Let some one invest money in the industry and then come forward and prove its success, then they would have something tangible. Sisal hemp had fallen fifty per cent in price lately, which he thought was not particularly encouraging.

Mr. Jacob Conrad's motion that it is the opinion of this meeting that the Government should offer four per cent on the amount expended in roads, railways and steamers for opening up the country, was formally laid over as a notice of motion.

The thanks of the Society were accorded to the Department of Agriculture, Canada, for a number of pamphlets and books giving information as to land grants to new settlers, &c.

The meeting then terminated.

Meeting held on the 13th August.—Hon. B. Howell Jones, President, in the chair.

There were 29 members present.

Elections.—*Members:* Messrs. John Manifold, C. D'Abreu, J. D. Smith and Baron H. T. Siccama.

Associates: Messrs. A. O. Smellie and E. E. King.

A letter from the Government Secretary was read, informing the Society that the Lieutenant-Governor had

received a visit from Mr. Roger Welles, who had been commissioned by the President of the United States to visit this colony to secure its co-operation in the Chicago Exhibition and asking for the views of the Society as to British Guiana participating in the proposed celebration of the Discovery of America.

The Chairman stated that the Directors had already met Mr. Welles, and he thought the meeting would go along with him in favour of the colony taking part in the World's Columbian Exposition of 1893. A great deal of trouble was being taken to make it a success, and it would be to the advantage of the colony to be represented there. He had already mentioned the matter in the Court of Policy, and he thought it probable that the Government would be in favour of a grant for the purpose. If the money was voted, an early start must be made, as hitherto they had not allowed sufficient time to collect proper specimens. For the present, he could do no more than bring forward the resolution proposed by the Directors, which was that

"This Society earnestly requests the Government to take such measures that this colony be represented at the World's Columbian Exposition, in which the Society will be willing to heartily co-operate."

Mr. Hawtayne seconded, and spoke in favour of the resolution. There might be a difference of opinion, he said, as to the utility of such exhibitions, but by showing the resources of the colony to the Americans something might be gained.

Mr. Jacob Conrad spoke in favour of the resolution, remarking at the same time that he considered the exhibition of 1886 a very poor one, but hoped with ample time they would be able to get together whatever the colony could produce.

Mr. Winter thought the resolution too bare, and proposed an amendment as follows :—

“ That in order to make a contribution to this Exhibition worthy of the capabilities and resources of this colony, such contributions should not be left to individual efforts, but the preparation of all kinds of natural products, and of all manufactures should be made on uniform lines as to quantity, quality and manner of presenting them in their most attractive form ; and that in all matters where competition can be excited amongst those inclined to devote time, care and attention to their preparation, the actual outlay expended thereupon shall be chargeable to the amount voted by the legislature for this purpose.”

The Chairman said that the matter had not yet reached that stage when the Society could go into details ; at present they were only asked by the Government to prepare the exhibits, meetings would have to be called and Committees appointed to settle everything.

Mr. Æneas Mackay supported Mr. Winter in criticising the exhibition of 1886, and hoped that the colony would be better represented at Chicago.

After some further discussion the original resolution was put to the vote and carried unanimously.

A report of Mr. A. R. Gilzean, Local Secretary for Essequibo, on agricultural matters in that country during the past three months, was read and referred to the Agricultural Committee.

A report by Mr. Howell Rickford on a Cattle Disease which had lately been prevalent on the East Coast, was read :—

Mr. Rickford stated that from inquiries made, it seemed that 262 cows, 8 mules and one horse had died of the disease up to the 11th August, but that no doubt this was far below the real number, since little attention was given to the matter at first, no accurate record of deaths being kept ; while no information had been received from some of the estates, and none as to the deaths among the villagers cattle.

Beginning at *Lusignan*, the disease appears to have slightly affected *Annandale* to the windward, but did not appear to have gone further.

No information had been received from *Nonpareil*, but from *Enmore* to *La Bonne Mere*, the disease had been absent. It seems to have been especially violent at *Mon Repos*, where the coolies alone lost 80 cows; at *Chateau Margot* 46, and at *Montrose* 50.

There could be no doubt of the infectious nature of the disease, and the spread was attributable to no proper precaution being taken in the first place to isolate the sick, and to bury the dead. Indeed, after the disease was well known to be prevalent, dead cattle were suffered to lie about the pastures among the living cows, mules and horses, until the crows had finished them off. The infectious nature was well illustrated in the case of *La Bonne Intention* where no deaths have occurred and where the pasture is isolated on one side by the village and on the other by the Company Canal, dividing it from *Chateau Margot*—neighbouring cattle being thus prevented from getting into the *La Bonne Intention* pasturage. On *Success*, they escaped the disease for a long time until it was introduced by some *Chateau Margot* carcasses being thrown into the pasturage trench. Coolies leaving the estates earlier affected and taking their cattle with the hope of saving them, also tended to spread the disease.

As to the nature of the disease, there was a consensus of opinion that the throat was the part affected, all the reports from the various estates agreeing in their main details. The animals had a drooping appearance to begin with, the glands of the jaws and throat began to swell, and a thick yellow discharge came from the nose—the symptoms being so rapidly aggravated that death resulted from suffocation in a few hours, sometimes 3 or 4, at others 12 or 14. Various remedies had been tried by rubbing the parts with tar, turpentine, laudanum, oil, ammonia etc., with blistering, and by giving purgatives; but apparently with little or no successful result.

In the absence of a Veterinary Surgeon, it was to be regretted that no diagnosis of the disease nor *post mortem* had been made by any of the medical staff; perhaps it was not yet too late since cattle were still dying of the disease. Some attention also should be given to have the infected districts declared, so as to cause prevention of further spread.

The Chairman said the matter was one of very great importance. It was rather a peculiar disease, as it attacked mules and horses, as well as cattle, and if something was not done it might spread to the other districts

of the colony. The matter was really one for the Government to take up and order some method of isolating the affected district.

On the motion of Mr. Bayley, seconded by Mr. Conrad, the Secretary was directed to forward a copy of the report to the Government as well as the Agricultural Committee and to forward the thanks of the Society to Mr. Rickford for his trouble in making the report and investigating the disease.

Mr. Conrad's motion that the Government be asked to guarantee four per cent on all capital expended in opening up the country, was postponed by consent of the meeting.

The discussion on Mr. Van der Vlies' paper was also postponed.

Mr. Vyle handed in a notice of motion as follows :—

" That this meeting been thoroughly convinced from the small evening attendance at the Reading Rooms, that such late opening of the Rooms is not appreciated ; be it resolved that the Rooms be closed in the evening from date."

On the motion of Mr. Mackay, seconded by Mr. Bayley, it was agreed to suspend the standing rule as to giving notice so as to decide the matter at once.

Mr. Vyle said he had given notice of this motion because he had taken part in trying to get the Rooms opened in the evening, thinking it would be an advantage to certain young men who could not conveniently visit them in the day. He had visited them on several occasions and never found more than four persons, and as the Society incurred some extra expenses, and the members did not seem to appreciate the convenience, the sooner they were closed the better.

After some discussion, it was resolved, there being one

dissentient, to close the Rooms in the evening after the end of the present month.

In regard to the opening of the Museum for two hours every Sunday afternoon, Mr. Quelch reported that the average attendance had been about 179. The largest number on any one afternoon had been 276, and the smallest 101.

Mr. Winter laid over the following notice of motion :—

“ That in the opinion of this Society, a most favourable opportunity now exists for combined action on the part of H. M. Government, the Government of India, and the Government of this colony, to concert measures for the conveyance and settlement upon the unoccupied lands of this colony, in village communities, some of the surplus population from India—and that for this purpose delegations from India of the people who may be favourable to the migration should be brought to the Colony, with a view to the selection of suitable sites for their location—and that the land so selected should be surveyed and plotted out in farms, rice fields, or otherwise, as may be decided upon by the respective Governments—the cost to be borne by each in such proportions as may be agreed upon.”

The Chairman stated that, in accordance with the recommendation of Mr. Bayley at the last meeting, that the Society should communicate with Major Walthall before his departure in regard to immigration from the Southern States, he had seen and conversed with that gentleman, who had written him a letter in which it was stated that he thought little practical benefit would result from such emigration unless a scheme was agreed upon by the government of both countries for the transportation of the people and as to the advantages to be afforded them on their arrival.

Mr. Bayley said that in view of Major Walthall's statements, he thought it almost useless to think of the matter, as it would be impossible that so elaborate and expensive a plan could be carried out.

Mr. Conrad and Captain White both spoke of the prosperity of the Southern negroes as compared with those of British Guiana, while the Revd. W. B. Ritchie said if he were a black man he would prefer the United States.

Mr. E. A. V. Abraham read a paper,* on the Insolvency Ordinance of 1884.

A vote of thanks was accorded, and the discussion postponed to the next meeting.

The Revd. W. B. Ritchie exhibited a lead plate with an inscription, which had been found in a sill in repairing the foundation of St. Andrew's Church. The inscription was as follows:—

"The building of this Church by public subscription was begun, and the first sill laid on the 12 day of August, anno Domini 1811, by His Excellency H. W. Bentinck Esq., Governor. The Rev. G. Ryk, President, the hon H. P. Van Berckel, E. A. Vernede and J. S. Masse (?) Elders. J. J. Kotwyk Esquire, V. A. Heyliger and L. Van Rossum Esquire, Deacons. J. Hadfield, Architect."

The thanks of the Society were presented to the Rev. W. B. Ritchie for a photograph of the plate.

The meeting then terminated.

Special Meeting held on the 18th August.—Hon. B. Howell Jones, President, in the chair.

There were 20 members present.

The Chairman said that before proceeding to the special business of the meeting, i.e. to hear Mr. R. Welles, the Special Commissioner from the Committee of the World's Columbian Exposition, he would read a report on the Cattle Disease, which he had just received

* Printed on page 251.—Ed.

from Dr. J. R. Hill, and which he thought very important as it suggested a remedy :—

Dr. Hill stated that he had only partially succeeded in obtaining information, since he had only been able to make one post-mortem, and to observe the symptoms of one animal during life. Arguing from the knowledge of human pathological processes, he was of the opinion that the animal which he had examined, had died of acute laryngitis, attended with Oedema of the glottis; and that the fatal issue was due to the Oedema, and the suffocation caused by it. There was no doubt that the animal he saw die, died from suffocation.

It was possible that this laryngitis was symptomatic of some infective fever, though it was unlikely, since in the case which he had watched there had been no rise of temperature.

One curious feature of the disease had been the immunity of certain estates, and he thought that this was most likely due to the frequent or continual flooding of the pastures on those estates; and that these had acted as buffers in stopping the spread further up the coast.

Counter-irritants had been applied as treatment; and probably a good method would be the application of a sharp vin: iodide of mercury blister, with the exhibition of linseed oil internally.

He would recommend :—

- (1) Flooding the pastures.
- (2) Strict isolation of infected animals, with careful daily examination.
- (3) Immediate removal of the dead, by burying deeply after being disinfected.
- (4) Disinfection of stable and cattle-shed.

He was of opinion that the carrion crows had been important factors in the dissemination of the disease.

The Chairman then introduced Mr. Welles, who gave a lucid account of the proposed exposition at Chicago.

The Chairman in thanking Mr. Welles for his paper, said he should like to see the colony represented in a proper manner at the exhibition. At the meeting of the Court of Policy, held that day the Governor had promised to call a special meeting of the Combined Court for the purpose of voting money for this object,

as well as to establish steam communication with the North-West Province. He also said that His Excellency had expressed himself as favourable to the placing of the arrangement for the exhibition in the hands of the Society. He felt certain the Combined Court would grant the money, and he hoped in a short time to be able to take some steps towards arranging for a local exhibition so that they might have a nucleus from which to select the exhibits for Chicago.

In reply to Mr. Vyle, the Chairman said the exhibition would be opened in May 1893 and be kept open for six months, and that the Directors would draw up a scheme for the approval of the Society.

A cordial vote of thanks having been given to Mr. Welles, the meeting terminated.

Meeting held on the 10th September.—Hon. B. Howell Jones, President, in the chair.

There were 13 members present.

Elections.—*Members*: Messrs. R. W. Edwards and F. C. Bankier.

Associates: Messrs. A. C. Rodrigues and M. J. D'Oliveira.

The Chairman read a letter from Dr. J. R. Hill as to the cattle disease on the East Coast in which he notified the spread of the disease to *La Bonne Intention*, and that the course of the disease was so rapidly fatal, that little was to be expected from treatment. From an examination of a mule which had died at *Chateau Margot*, it was clear that the animal had died of suffocation. A copy of the letter was directed to be forwarded to the

Secretary of the Cattle Disease Commissioners for their information.

The Chairman stated that the disease was supposed to be Laryngitis and one little known in England. He was sorry to say that there was no law in the colony to prevent the infected cattle being removed from one place to another, and even if taken to the slaughter house they could only be sent away, and that within certain hours.

Mr. Davis said that from conversation with a gentleman from Venezuela he had learnt that the disease was known there and treated in the rather heroic manner of cutting off the end of the tail and the ears, at the same time administering emetics.

Mr. Jacob Conrad brought forward his motion of which due notice had been given, that the meeting pass a resolution in favour of the Government offering four per cent on capital invested in opening up the country. There was only one way, he said, to open up the country and that was by means of capital, but no capitalists would come forward and advance money without some guarantee from the Government. They wanted a million or two and if the country was opened up and the population increased, which would certainly follow, the imports would be increased, and with them the revenue, so that they could well afford to pay the four per cent from that alone. He did not propose that the interest should be paid for ever, but for a fixed period of fifteen to twenty-five years, and that the Government should demand a deposit as a guarantee that the scheme should be properly carried out. He thought it a pity that in a colony like this such large sums should be paid annually

for imported rice and other things which could so easily be grown here, and he would like to see provision growing subsidised for a time. In reply to Mr. Smith, who asked what control the Government would have over the expenditure, Mr. Conrad said that the money being deposited with them they could prevent its misappropriation. "Why then could not the Government do the work?" said Mr. Smith, to which Mr. Conrad answered that it was well known that Government undertakings always cost more than those of private persons; by his plan they would have the energy and economy of individuals under Government control.

Mr. Davis seconded the motion for the sake of discussion, remarking that he did not quite understand how it would work.

Mr. Bayley considered the scheme impracticable and Mr. Smith coincided in this opinion thinking it useless to discuss it, he preferring rather that the Government should open up the country.

On being put to the vote, the motion was lost, three being for it and three against, the Chairman declining to give his casting vote and several members remaining neutral.

The Chairman gave notice of his intention to read a report on the working of Mr. Skekel's Patent Cane Mill at *Herstelling*, at the next meeting.

The discussion on Mr. Van der Vlies' paper on Sea Defences, which had been postponed from the July meeting, having been declared open and Baron Siccama asked to give his views on the matter, he stated that he was not prepared at the moment to speak on a question of so much importance.

Mr. Davis suggested that, taking into consideration the fact that a bank or island had been formed round the wreck of the *Dauntless*, this natural formation might be taken advantage of for protecting the foreshore, by sinking hulks in suitable places.

The Chairman said that the matter was one of very great importance, but difficult to grapple with, from its many phases at different times. The wash affected the shores to an enormous extent, forming sand-banks in some places which obstructed the drainage, and then suddenly carrying these away in a few hours. Local information could be obtained easily enough, but to get a comprehensive view of the matter was another thing. With it was connected the question whether it was the business of the proprietor of an estate to protect his foreshore, not only for his own benefit, but for that of his neighbours as well, whether he should combine with his neighbours for that purpose, or finally whether the work should not be undertaken by the Government. From his experience it appeared to him that wherever the mouths of the rivers had been maintained the foreshores for a considerable distance on either side had been preserved. It was useless to undertake sea defences for the purpose of reclaiming or making up land, as such new land was quite valueless, besides being nothing more than malarial swamps. Besides this, the natural drainage would at once be stopped and draining engines or other artificial measures have to be adopted, at considerable cost. Referring to the paper of Mr. Van der Vlies, he said it was of great interest as showing the importance of good fascine work, and the way in which this should be performed. He would therefore

propose a vote of thanks to Mr. Van der Vlies for his valuable paper.

This having been seconded by Mr. Davis, was carried unanimously,

The discussion on Mr. Abraham's paper on the Insolvency Ordinance was postponed.

Mr. Quelch, Curator of the Museum, exhibited several interesting specimens lately added to that department.

The meeting then terminated.

Meeting held on the 8th October.—Hon. B. Howell Jones, President, in the chair.

There were 27 members present.

Elections.—*Members*: R. C. F. Chown, Fred. May and Dr. M. Irving.

Associates: C. J. E. Austin, G. A. Griffiths, Wm. Marshall and F. Grammar.

A letter from the Government Secretary was read, authorising the Society to undertake the management of affairs in connection with the representation of the colony at the coming Colonial Exposition of 1893, and to appoint a Committee for that purpose.

The Chairman stated that the Directors had held a meeting and decided to ask the members of the Society's Committees to unite in forming one large Committee for the Exhibition. As soon as their acceptance had been obtained, a meeting would be held and arrangements made to commence the work.

Mr. Winter brought forward his motion as to the Governments of India and this colony being asked to concert measures for the settlement of some of the sur-

plus population of India in British Guiana, to which he proposed that the following addition be made :—

“ That in pursuance of this project, this meeting urges upon the Colonial Government, the desirability of the favourable re-consideration of certain resolutions presented to the Combined Court so far back as May 1867, by the Honourable John Gordon, then a member of that Court. Lapse of time and change of circumstances have now removed many objections which at that time seemed to be inseparable.”

The resolutions referred to, Mr. Winter said, were as follows :—

“ That from the sparseness of its present population, the productive capabilities of British Guiana are not sufficiently developed, and any project having for its object the increase of the population and the supply of the great want of the country, labour, deserves the encouragement of this Court.

“ That such a wide area of fertile land, which a bountiful Providence has placed at the disposal of the British Crown, would present an attractive colonizing field to many who now inhabit densely populated countries, were the advantages afforded by British Guiana made known, and encouragement held out to free settlers.

“ That no colony offers a more profitable investment for capital, and were the Crown Lands thus settled, a wider scope would be afforded for its beneficial employment in the formation or extension of Canals, Tramways Steam Communication, Electric Telegraphs, &c., and this Court therefore recommends to the Government, the consideration of the question of having the Crown Lands (in certain localities to be hereafter determined on) surveyed and laid out in plots, due regard being had to highways and roads, with the views of making free grants of them to settlers, upon conditions which will ensure their cultivation within a given period.

" That in anticipation of the revenues that must arise from the increased population giving increased production, in the opinion of this Court, it is sound policy to foster and aid all undertakings which, although at the first tending apparently only to the advantage of a few, yet eventually and really contribute to the well-being of the many; and this Court therefore will authorise advances of money (upon moderate interest, and repayable by easy instalments) to the free settlers upon Crown Lands, for the erection of houses, and for the draining and bringing into cultivation the lands so allotted to them, such advances to be expended under official inspection, and to form a first lien upon the land and buildings until repaid with interest.

" That the principle of raising loans of a reproductive character having been already affirmed, and for the purpose of enabling the Government to carry out the objects indicated, this Court authorises the issue from time to time, in such sums as occasion may require, but not in the whole to exceed £1,000,000 sterling, of Government Debentures, bearing interest payable half-yearly at, or under, the rate of six per cent per annum, to be secured upon the Revenues of the colony not already pledged in security for existing loans."

Mr. Winter said that £11,000,000 had been spent by the colony in coolie immigration since 1870, a large portion of this having gone for back passages. If the same amount had been spent with a view to colonisation better results would have accrued. India had a surplus population, which was a burden, and he thought the Indian Government could well afford to forward immigrants without cost to this colony.

Mr. J. D. Smith seconded the motion, saying that the gold industry was depopulating some parts of the colony, and that nothing short of a large immigration could do any good, while the only likely place from which this could be obtained was India.

Mr. Darnell Davis in supporting the motion said the system of back passages was an evil which he hoped would soon be abolished or at least modified. Another evil was the inequality of women, more he thought should be brought, not necessarily bound to labour, but indentured on estates so as to help in retaining labourers.

The Chairman was glad to hear such practical men as Messrs. Winter and Smith advocating free immigration. He should be glad to see the burden taken off the shoulders of the planters, and borne by the colony as a whole. He felt that if sugar estates were ever again to be prosperous, that it would be necessary that their proprietors should be relieved of some of their burdens and especially that of immigration. If the system suggested by Mr. Winter should be tried great care would have to be taken in selecting the locations for the settlements, and the new-comers would have to be under supervision for some time after their arrival, as they would be little better than children at first. He agreed with the motion and hoped it might lead to some good result.

Having been put to the vote the motion was carried unanimously, and ordered to be forwarded to the Government as a recommendation from the Society.

The President stated that as it was getting late he would postpone the reading of his paper on Mr. Skekel's cane mill.

The Assistant Secretary read two letters in reference to the Cattle disease, which had been received in answer to enquiries as to whether the disease was known elsewhere, and if so what treatment should be adopted. Dr. J. F. Chittenden of Trinidad said that a form of contagious pneumonia had been prevalent in Trinidad for some time past, but no special treatment had been attended with any success. The Secretary of the Royal Veterinary College, London, stated that he had referred the Society's letter to Professor Macqueen, who was doubtful whether it was Malignant Œdema or Catarrh, or Anthrax, and asking that some one with a knowledge of the disease should furnish a full account of the symptoms and forward a sample of blood from a recently dead animal.

The President said that since the last meeting of the Society, Dr. Ferguson had been making microscopic investigations of the blood of several animals that had died of the disease, and found a bacillus which appeared to be that of Anthrax. A Commission to enquire into the matter had been appointed by His Excellency the Lieutenant Governor, and if it should be proved to be Anthrax, they knew this to be incurable. He was glad to say that it appeared to be on the wane, but it might break out again at any moment. Dr. Ferguson had kindly come to show them a slide of the supposed Anthrax bacillus and he was sure the meeting would accord him a hearty vote of thanks.

Dr. Ferguson said the practical question which they had to consider, was how to get rid of the disease. It was useless to flood the pastures, as this tended rather to diffuse it. It might be neces-

sary to inoculate all the animals on the coast, but in the meanwhile dead carcasses should be burnt, and any carts used in their conveyance thoroughly disinfected. He would also call attention to the fact that Anthrax was communicable to human beings, through drinking the milk or other means, and he would mention that during the last week several suspicious cases of unusual oedematous affections from the East Coast had been treated in the hospital, which might be that disease. It was decided to endeavour to procure a sample as requested for the Royal Veterinary College and to thank Dr. Chittenden for his information.

The following paper on Tides and Tidal currents by Captain Montague Jones was taken as read, and left over for consideration at the next meeting :—

To begin with the tidal wave in the North Atlantic: It is easy to understand its cause and effects when we consider the rapid revolution of the earth from west to east.

How the surface of the ocean recedes from its centre as demonstrated by charts of tidal currents :—By way of brief illustration, take the tidal wave from the Indian Ocean rounding the Cape-of-Good-Hope towards the equator, dividing itself on the coast of South America, forming what is commonly known as the equatorial stream, taking its course in a westerly direction along our shores at no great distance ; carrying with it those immense volumes of water from the Amazon, Corentyne, Berbice, Demerary, Essequibo, and Orinoco rivers sweeping through the Caribbean Sea, gulf of Paria, and through the gulf of Mexico to meet the mighty Mississippi, debouching between the coast of Florida and the Bahamas, to swell the perpetual current of the gulf stream (so well understood in our days for its temperature and beneficial effects on the climate of the British Isles); dividing on the West Coast of Ireland, running up the British channel, sweeping in the Bay of Biscay, and forming a perpetual current through the Straits of Gibraltar. Then in a southerly direction along the Coast of Africa, forming a sort of whirlpool in the North Atlantic ocean.

“ The tidal wave in deep sea is merely an undulation : but when shall

" low seas or bays are reached, the movement of the water is discernible.

" The general principle is, that in the deep sea there is a quick movement of the wave, and a slow movement of the water which is called a tidal current; these currents are frequently spoken of as flood and ebb tides; but the terms (although sanctioned by usage) are not correct, because flood and ebb are applied to the rising and falling of the water, which is quite a different thing.

" The flood current in a channel supplies water for the wave, but the wave requires water after its summit has passed any particular point. So that at that point flood current continues, although ebb tide has commenced. Similarly the current may continue after flood tide has commenced."

The above, quoted from high authority is practicably noticeable on our shores and rivers, especially during spring tides, at the entrance of the Port of Georgetown, when the tide falls along shore, long before the midstream turns, indicating ebb tide.

A good illustration of this effect is seen at spring tides, when the tide is at its highest on the Best "flats;" in falling, it rushes to join the stream from the eastward until it reaches off La Penitence. By that time the above mentioned "flats" off the Best are uncovered, the tides having thus fallen 12 or 15 inches. The stream then tends its way out of the Demerary river to the eastward, and loses its force after reaching a distance of from 12 to 15 miles off shore according to certain seasons.

A remarkable fact is, although the perennial current runs in a West or W.N. West direction, the ebbing or falling of the water level runs in an opposite direction, but the flood when blending with the outside current, sweeps down with the prevailing trade winds obliquely along our coast thus causing such destructive wash along the shore which requires such substantial works for protection as we have from the Fort up the East Coast admirably adopted for the purpose.

Though I may be out of my latitude in engineering, I have an idea that something more could be accomplished for the protection of the coast where most exposed. The groins which are thus constructed show an accumulation of sand on the opposite of windward side caused by the direction of the wind and waves. I believe that if bulks laden with rough stone were sunken some little distance below low water mark, they would form a nucleus or foundation for sand reefs. Loose large stones could easily be deposited in position for same purpose.

The rise and fall in our rivers, is generally known and they are

influenced by the seasons. On the Essequibo, in the rainy season, though the stream of ebb, say from Bartica at the confluence of the Mazaruni is continually running down, the rise continues until the time of high water. Thus the downward current increases in velocity, sweeping along the shores and the numerous islands in its course, undermining some and adding to the size of others, and carrying seaward sand, which, in turn, becomes other islands.

We have an example with the Leguan bank, which in 1862 overflowed at high water, not a vestige of verdure to be seen growing, and is, at present, covered with trees, from deposits of seeds made from time to time, and assisted by some added under my directions.

About the same period a sand bank, which had gradually increased in length, parallel with the course of the river, below the Lau-lau islands, showed signs of verdure, with fine rushes, commonly called Bisi-bisi which was followed with courida and other shrubs.

The old maps of the colony show an island on the Essequibo marked Holand Island, of which nothing remains but a bed of rocks and roots of large trees at low water. In other parts of the River huge boulders, water-worn, above the surface, have disappeared from being undermined by the strong currents, and toppled over in deep water. These changes are continually going on, and we can also see a great change on the land and coasts which are considerably below the level of the sea.

The spring tide on the 18th September, of this year rose as on many occasions, overflowed and ran across Water Street, which is considerably above the level of Georgetown.

Happily we are not under the influence of great tidal surface waves, though occasionally a regular wave has been observed coming diagonally along the East Coast from an E. N. East direction.

I notice at the Stabroek Market river side that a small dam had been made with clay to prevent the overflow in the Market.

A letter of E. L. Max on the question whether provision could be made in the colony for a settlement of Russian Jews, was also laid over to the next meeting.

The thanks of the Society were accorded for the following donations :—

From G. H. Richter. — "Semler's "Die Tropische Agricultur."

From Mrs. Clark. — *Royal Gazette*, May to August 1819.

The meeting then terminated.

Meeting held on the 12th November.—Hon. B. Howell Jones, President, in the chair.

There were 21 members present.

Elections.—*Member* : Mr. Wm. McLaren Reid.

Associates : Messrs. T. A. Kennard, C.A.

Edghill and Jno. Williams.

The President reported that since the previous meeting, the Columbian Exposition Committee had met and appointed ten Sub-Committees to deal with the different classes of exhibits. One of them, to be called the Literary and Antiquarian Sub-Committee would undertake the duty of preparing the catalogue and description of the colony, which he hoped would be illustrated with maps and views. The Sub-Committees were small, but they were empowered to add to their numbers either from the members of the Society or outsiders. Most of them had held meetings and applied to persons throughout the colony for assistance, receiving favourable replies from many, so he hoped soon to see that some progress was being made in the collection of exhibits. He might also mention that a supply of sample bottles had been ordered from England so that the exhibits should be shown in a proper manner.

A letter from the Government Secretary was read, acknowledging the receipt of a copy of the resolution passed at the previous meeting in regard to settlements of East Indians, and stating the matter would receive the early consideration of the Government.

The President called attention to the fact that the next general meeting would be that for the election of officers for the ensuing year. He hoped the meeting would be a large one and that a careful selection would

be made. They specially wanted assistance from every one qualified to give it, as next year would entail a great deal of trouble and anxiety, in connection with the Exposition, on all the officers of the Society.

The paper on Mr. Skekel's mill, by the President, which had been published in the *Daily Chronicle* since the previous meeting was open for discussion.*

Mr. G. B. Steele thought the indicated horse-power mentioned in the paper was a great deal too high, to prove which he submitted several sets of figures.†

The President said there could be no doubt that the work done by Mr. Skekel's mill was equal to that of the very best three-roller mill in the colony. Single crushing was however almost a thing of the past. In other places double and even treble crushing had been introduced, but the only instance of the latter in this colony was at *Diamond*, where 78 per cent of juice had been extracted by it. Differences of opinion were held as to the advisability of carrying the extraction so far, as the extra power required, and the increase of impurities in the last small per centage, raised the cost of working to a considerable extent. However, he believed that good results had been shown at *Diamond*.

The President declared that Mr. Abraham's paper on the Insolvency Law was open to discussion.

Mr. Woolford said he had been in hopes that some of the mercantile community would have taken up the matter, which he thought was one of more importance to them, than to the profession to which he belonged. They ought to be thankful to Mr. Abraham for exposing the

* Paper printed on page 311.—ED.

† These are incorporated in a paper printed on page 337.—ED.

anomalies of the law. There was no doubt it required repealing as it had proved unworkable. To prove this he gave several cases, where debtors having property, defied their creditors and under this law could not be punished. In conclusion he hoped the Society would move for the repeal of the ordinance and that it be replaced by something more practical—something that everybody could understand and that could be put in working order.

The President said that as the matter had been already taken up by the Chamber of Commerce he hardly thought it necessary for the Society to pass a resolution on it. There was no doubt but that it required amendment, and this was the opinion, not only of barristers, but of the mercantile community. On enquiry he had been much surprised to find that the bill had been brought into the Court without being shown to the judges. It was impossible for legislators to know all the details of a bill; it was therefore a great mistake that the legal authorities had not been consulted. However, he had no doubt that the Chamber of Commerce would carry the matter through and not let it rest until the law was repealed.

After Mr. Abraham had made some remarks in reply to questions, a vote of thanks was accorded to him for the trouble he had taken in bringing the matter before the Society.

Mr. C. Montague Jones' paper on Tides and Tidal Currents having led to no discussion, the President moved a vote of thanks to the writer, which was carried, and expressed his regret that no one present had taken it up.

In the matter of Mr. Max's letter as to a settlement of

Russian Jews in the North-Western District, the President thought it should be submitted to the Government.

Mr. Max said he thought the Jews in question were good agriculturists. He could state that thirty thousand families were helping to produce the large quantities of corn annually shipped to Germany and other places. This colony wanted population, and he did not think they could have settlers more suitable than these. Baron Hirsch would pay their passage, so they would cost nothing to bring here, and he would suggest that a Committee be formed to consider the matter.

Mr. Bayley spoke in favour of the proposed settlers, and moved that a Committee be appointed to consider the best means of dealing with the question. This having been agreed to, the President appointed Messrs. B. S. Bayley, F. A. R. Winter, E. L. Max, and Æneas D. Mackay to form the Committee and report to the Society what they considered most desirable.

The President called attention to some specimens of a superior kind of pottery on the table, which had been forwarded by Mr. A. Shanks as manufactured on his plantation *Vreed-en-Rust*. A vote of thanks was accorded to Mr. Shanks for allowing the meeting to inspect these samples of a new industry.

The thanks of the Society were accorded to the Dutch Government for 28 Reports and Catalogues of the National Library, and to the U. S. Government for 18 Reports and Pamphlets from the Treasury Department.

Mr. Quelch called attention to a pair of the wings of an Albatross lately presented to the Museum, by Capt. Hatfield which were over eleven feet across.

The meeting then terminated.

Special Meeting held on the 13th November.—Hon. B. Howell Jones, President, in the chair.

There were 25 members present.

The President stated that he considered the matter of the Sea Defences of the colony such an important one that he had thought it best to call the present special meeting to hear Baron Siccama express his views, which he felt sure would be valuable owing to his long experience in Holland as well as here. He was sure they would all thank Baron Siccama for devoting that afternoon to their instruction, and he was certain that the lecture would be instructive and tend to the welfare of the colony by telling them what should be done to save it from the inroads of the sea.

Baron Siccama then gave his lecture, which was mainly *extempore* and illustrated by charts and diagrams.*

The President said it was a pleasant duty for him to thank Baron Siccama on behalf of the Society and he hoped the information would be invaluable to them. He then detailed some of his own experiences of the alternate denudation and silting on various plantations from Berbice to Essequibo. He had recommended facing the dams with stone in 1882, but on account of the expense it had not been done, the consequence being that four times as much money had been spent on measures which were of no permanent benefit.

A hearty vote of thanks having been accorded, the meeting then terminated.

Meeting held on the 10th December.—Hon. B. Howell Jones, President, in the chair.

* Printed on page 301.—ED.

There were 26 members present.

Elections.—*Members* : Dr. H. Master and Mr. A. G. Bell.

Associates : Messrs. R. W. H. Jones, Jules Pairaudeau, A. B. Clarke and Wm. Campbell Calder.

The Assistant Secretary laid over the following report from the Jews' Colonization Committee :—

The Committee having carefully considered the feasibility of receiving a limited number of Jewish Immigrants to be brought here from Russia at the expense of Baron Hirsch, report as follows :—

That, as in the opinion of this Committee the settlement and development of the North-West District, which is at present practically uninhabited, are matters of considerable importance to the future of this colony, this Committee recommends ;

That the Royal Agricultural and Commercial Society should approach the Colonial Government with the recommendation that the opportunity of obtaining settlers on the terms offered by Baron Hirsch to Mr. Max, his representative here, should not be lost ; and that a colony of say five hundred settlers, who shall be agriculturists, of which single adults shall not be over fifty years of age, and families of say father and mother with three or more children, two of which shall be adults, but without limit as to age of parents, should be brought to the colony at Baron Hirsch's cost ; and being so introduced shall be housed in Georgetown pending their removal to the North-Western District, at Government expense.

That free grants of five to fifteen acres of arable, and one hundred to one hundred and fifty acres of pasture land shall be made to each single adult or family (it being understood that such grants may if required be increased by purchase at the price of one dollar per acre under the Land Laws of the colony) for a period of five years, upon which benabs shall be erected for their shelter.

Implements, seeds, and breeding stock to be provided free of cost to the immigrants by the Colonial Government, who shall provide them with rations on the scale fixed for the labourers engaged in the Gold Industry, for a period not exceeding nine months from the date of their arrival, or until the first crop of edibles shall have been reaped ; the total cost of such advances to be a rent charge after the first year of not exceeding two dollars per acre for arable, and ten cents per acre for

pasture land, for a period of ten years, or until such advances shall have been repaid. Such per caput advances in the aggregate, not to exceed the cost of introduction of an adult coolie from India.

That the land shall be surveyed and plotted out in blocks as may be required.

That the roads shall be made up by the Government ; who shall employ for that purpose all the male settlers who may be willing to engage in the work, the remuneration therefor being such as is usually paid for similar labour in this colony.

Materials for house-building, other than those found upon the land, to be provided by the Government ; the cost thereof to be repaid in like manner as other money advances previously described.

That this experimental colony if successful shall be increased, until a community sufficiently large to be self-supporting shall have been formed.

On the motion of Mr. Bayley this was left over for consideration to the next meeting, so that it might be circulated before the Society came to a final decision.

The Assistant Secretary read a letter from the U. S. Department of Agriculture, in reply to an enquiry on behalf of the Society as to whether corn shipped from the United States underwent any special preparation before shipping to the West Indies. The answer being in the negative.

The Chairman said this communication confirmed what he had supposed before, that the reason why our corn did not keep, while that from America remained uninjured for a reasonable time, was owing rather to the difference in climate than to any special mode of preparation.

The Assistant Secretary was directed to procure the information asked for in the letter, from importers of corn, and forward it to the writer.

The Chairman stated that two papers on the recent decision of the Marowine Boundary Question had been

kindly forwarded to the Society by Baron Siccama, and Mr. D'Oliveyra, Consul for the Netherlands. The first, which was in Dutch, had been given to Mr. Christiani, who had kindly promised to translate it, but as it was not yet finished, it would have to be brought up at the next meeting. The second, was the decision of the Emperor of Russia, which Mr. Legge had been kind enough to translate from the French, and was specially interesting as bearing upon our own boundary dispute with Venezuela. The paper having been read, a vote of thanks was accorded to the Dutch Government for kindly forwarding the information, and to Mr. Legge for his translation.

The President said that, before proceeding to the election of Office-bearers for the ensuing year, he would, as was customary, say a few words as to the work done by the Society during his term of office. There had been an increase in the membership, but it had not been as great as might he wished, as the losses by death, departure from the colony and resignations, tended to keep down the number. During the year four members and three associates had died, among them being the well-known names of Messrs. Gallwey, Moore, Clarke and Mulligan. He felt sure that all these would be greatly missed, especially Messrs. Clarke and Mulligan, who had been connected with the Society for so long a time. The roll of the Society now contained the names of 199 Ordinary Members, 69 Country Members, 212 Associates, and 19 Lady Subscribers, total 499, which showed an increase of 26 since the list was revised on 1st January last. Greater interest had been taken in the General Meetings, the attendance having reached

an average of about 23, against that of 14 in former years. Several important matters had been considered at these meetings, some of them having to be adjourned from want of time to discuss them at one meeting. Up to the present fifteen meetings had been held, at nearly all of which one or more papers had been read. In May Mr. Rockcliffe and Captain Montague Jones gave them papers on Engine Management and the Port of Georgetown. In June they had a very important paper from Mr. Kenrick on Opening up the colony, which caused a great deal of discussion, and led to the result that more interest had since been taken in the progress of the colony. In July they had a paper on Sea Defences from Mr. Van der Vlies, and in August one by Mr. Abraham on the Insolvency law. In the latter month a special meeting was held to meet Ensign Welles, and hear his remarks on the World's Columbian Exposition.

In October Captain Jones read a paper on Tides and Tidal Currents, and he himself on the Experimental working of Mr. Skekel's mill at Herstelling. In November a special meeting was called to hear Baron Siccama give his views on the Sea Defences of the colony.

Among the many important matters discussed at the meetings, were the outbreak of cattle disease on the East Coast, opening up the country, the Columbian Exposition, an agricultural college, and several projects for colonisation, including one at present under consideration in regard to the settlement of Jews in the North-Western District

The library had been increased by the addition of 450 volumes, while several additions had been made to the list of periodicals.

The Directors would be very glad to see more ladies joining the Society, as at present the number was very small.

Five lectures had been given during the year but from the fact that scientific men were rather scarce here, these had not been so regular as in past years or so regular as might have been wished. Sir Charles Bruce had done them the honour of reading a paper on "Books," Mr. Vyle on the "Electric Light," Mr. Sherington on "Journalism," Mr. Quelch on "the Snakes of British Guiana," and Mr. Rodway on the "Discovery of America." These lectures were well-attended and were sources of great interest and instruction to the members of the Society. He could only hope that they would be continued, and that members would come forward and give more of the same class so that the lady members of their families might again and again enjoy such intellectual evenings as they had in the past. During the year an attempt had been made to increase the popularity of the Reading Room by opening at night, but he deeply regretted to have to say that it had been unsuccessful. In this climate men did not care to go out in the evening simply for the purpose of reading, but preferred to remain at home and occupy themselves with reading or social amusements; he was afraid therefore that the Society would not be encouraged to try the experiment again for a very long time.

The Berbice Industrial Exhibition, which might be considered as having been under the auspices of the Society, had turned out a great success. The people of the sister county had come forward in a very enthusiastic manner, and under Dr. Rowland, the Secretary

of the Exhibition Committee, everything had been brought to a satisfactory issue.

During the year fair progress had been made with the Museum. Many additions had been made, new cases bought, better arrangements carried out and a great deal of work done towards the identification of specimens with a view to the completion of a trustworthy catalogue. It still continued to attract a large number of visitors, the weekly average being about two thousand. These being of all classes, a great deal of supervision was necessary, besides which a great deal of the time of the Curator was taken up in explaining to them orally the peculiarities of the specimens, and in answering questions.

In regard to *Timehri*, although costing the Society about \$250 a year, it did good in keeping it before kindred institutions in other countries, besides which the fact of their having such a journal raised the status of the Society; the amount spent on it might therefore be considered as far from being altogether a loss. Further, from the fact that under its present editor it is kept up to a very high standard for a colony like this, applications for exchanges are continually being made, to the advantage of the Reading Room and the Society generally, which is thus provided with a number of journals that otherwise might be wanting. Great praise was due to the editor, and he hoped that every member would help him with contributions on subjects with which they were familiar.

In conclusion, he had to thank them all for their courtesy towards him during his term as President of the Society. He had endeavoured in every way to

exercise the spirit of fairness in deciding when his judgment was called for, and he could only say that he had been thoroughly supported and assisted by the members of the Society in general.

The President said that as the next matter on the Agenda was the election of Office-Bearers for 1892, he would propose that Mr. A. Weber be elected President, which, being seconded by Mr. Bayley, was carried unanimously.

On the motion of Mr. Daly, seconded by Mr. Æneas Mackay, the Hon. B. Howell Jones was unanimously elected Vice-President. The Chairman said they could not possibly do better than retain their Honorary Treasurer, which being unanimously agreed to, Mr. Conyers was declared re-elected.

Mr. Darnell Davis proposed that Mr. Geo. Garnett be elected Honorary Secretary. In the beginning of the year, he said, he accepted the office at the request of the Directors, but only temporarily. The time having arrived for appointing his successor, he had asked Mr. Garnett whether he would be willing to serve, and that gentleman had said yes, if the members elected him. His idea was that the Society should be something more than a Commercial Society in name and therefore he thought Mr. Garnett as a merchant would be a very suitable person for Honorary Secretary.

Mr. C. P. Austin in seconding the proposition said he regretted that Mr. Davis would not consent to remain in office. Canon Moulder and Mr. Vyle supported, both also regretting Mr. Davis' refusal to allow his re-election.

Mr. Watt thought that as Mr. Davis had not expressly refused to serve, they should re-elect him, to which the

President replied that the Directors had tried their utmost to get Mr. Davis to remain but had failed.

Mr. Davis having declared his aversion to being re-elected, and asked that they would not do such a thing against his wishes, Mr. Garnett was unanimously elected.

The other Office-Bearers were also duly elected, as per list attached.

Mr. Cunningham moved a vote of thanks to the retiring President, which having been heartily accorded, Mr. Howell Jones in acknowledgment said he would always do his best to assist the Society, whatever position he might hold in it.

Votes of thanks were also given to the Assistant Secretary, and the Curator of the Museum, for the energy with which they had performed their duties during the year.

The thanks of the Society were accorded for the following donations to the Library :—

The Colonial Government—61 vols. Royal Gazette, 1820—1864.

Mr. William Blair—8 vols. Morton's Handbooks to the Farm.

Agent-General for Victoria—Judgment in the case of Musgrave v Ah Toy.

Dutch Government—Ordinances of Surinam relating to the Gold Industry, Land Grants, &c.

The Curator of the Museum exhibited a specimen of a twin flower-stalk of the sugar cane with two panicles.

The meeting then terminated.



Office-Bearers for 1892.

Patroness :

THE QUEEN.

Vice-Patron :

THE RIGHT HONOURABLE VISCOUNT GORMANSTON, K.C.M.G.,
GOVERNOR AND COMMANDER-IN-CHIEF, &c., &c., &c.

President :

A. WEBER

Vice-President :

HON. B. HOWELL JONES

Hon. Secretary :

GEO. GARNETT

Hon. Treasurer :

F. A. CONYERS

Ordinary Directors :

S. M. BELLAIRS

THOMAS DALY

GEO. H. HAWTAYNE, C.M.G., F.R.G.S., C.M.Z.S.

LUKE M. HILL, B. ENG.

H. KIRKE, M.A., B.C.L.

E. C. LUARD

Managing Directors :

B. S. BAYLEY

W. S. TURNER

F. A. R. WINTER

Exchange Room Directors :

J. J. DARE

T. H. GLENNIE

C. WIETING

*Agricultural Committee.**Chairman :* W. A. WOLSELEY*Vice-Chairman :* S. M. BELLAIRS*Secretary :* J. GILLESPIE

W. P. ABELL
ROBT. ALLAN
GEO. BAGOT
A. BARR
C. L. BASCOM
G. M. BETHUNE
A. BRAUD
R. B. BUTTS

S. R. COCHRAN
J. M. FLEMING, M.A.
A. R. GILZEAN
J. B. HARRISON, M.A., F.G.S.,
F.C.S.
G. S. JENMAN, F.L.S.
HON. B. H. JONES
E. C. LUARD

JAS. SMITH.

Commercial Committee:

Chairman: J. J. DARE

Vice-Chairman: W. H. SHERLOCK

Secretary: JACOB CONRAD

B. S. BAYLEY
A. BARR
W. W. BIRCH
F. W. COLLIER
W. CUNNINGHAM
J. H. DeJONGE

J. P. FARNUM
FERRIS GRANT
J. S. HILL
E. McLEOD
A. SUMMERSON
JAS. STUART

E. T. WHITE.

and the Exchange Room Directors.

Committee of Correspondence:

Chairman: GEO. H. HAWTAYNE, C.M.G., F.R.G.S., C.M.Z.S.

Vice-Chairman: JOHN DUKE SMITH.

Hon. Secretary: J. J. QUELCH, B. Sc., Lond., C.M.Z.S.

Treasurer: F. A. CONYERS.

S. M. BELLAIRS
DR. P. CARROLL
N. DARNELL DAVIS
P. P. FAIRBAIRN
LUKE M. HILL, B. Eng.
G. S. JENMAN, F.L.S.

HON. B. H. JONES
W. W. KENRICK
H. KIRKE, M.A., B.C.L.
ÆNEAS D. MACKAY
W. S. TURNER
SAMUEL VYLE

F. A. R. WINTER.

Book Committee :

DR. ANDERSON	C. H. G. LEGGE
HIS HON. N. ATKINSON	REV. CANON MOULDER
C. P. AUSTIN	C. G. PARNELL
B. S. BAYLEY	REV. E. POCKNELL
DR. P. CARROLL	REV. D. J. REYNOLDS
N. DARNELL DAVIS	REV. W. B. RITCHIE, M.A.
GEO. H. HAWTAYNE, C.M.G.,	R. A. SWAN
F.R.G.S.	W. S. TURNER
H. KIRKE, M.A., B.C.L.	J. VEECOCK

S. VYLE.

Local Secretaries (Berbice) DR. E. D. ROWLAND.*(Essequibo)* A. R. GILZEAN.*Curator of Museum :* J. J. QUELCH, B.Sc., C.M.Z.S., Lond.*Assistant Secretary & Librarian :* J. RODWAY, F.L.S.*Resident Director in London :* NEVILLE LUBBOCK.

List of Popular Science Lectures.

24.—"THE ELECTRIC LIGHT."

*Delivered on Thursday, February 26th, by S. Vyle, M. Inst, T.E.,
Government Electrician.*

The lecturer began by briefly indicating the advantages of the electric light over gas, oil, candles, etc., for illumination, more especially in houses and closed places. The various pertinent electric and magnetic discoveries of Galvani, Volta, Davy, Oersted, Faraday, etc., were then described, together with the chief electro-magnetic applications of the principles of these discoveries, by Pixé, Thomson-Houston, Edison, Swan, etc. The electro-magnet was described in detail and an explanation given of the electric volts, amperes and watts. The method of use, the fitness for decorative illumination and the safety of the electric lighting, were then pointed out, and mention made of the steady increase of companies for the furnishing of electric lighting in England, Scotland, and Ireland, and particularly the United States of America.

The lecture was illustrated by, and the lecture room illuminated with, arc and incandescent lamps, provided through the courtesy of the Directors of the British Guiana Electric Lighting and Power Company.

25.—"JOURNALISM, OLD AND NEW."

Delivered on Tuesday, March 24th, by R. O. Sherington, Editor, Daily Chronicle.

The lecturer began by briefly tracing the history of Journalism from ancient to modern times, pointing out

the methods by which the current news was circulated and the various steps taken to render these methods complete. The supremacy of the press during the close of the eighteenth century was more especially touched upon with a full recognition of the brilliant writers who made the epoch famous. The methods and characteristics of modern journalism, as illustrated by the business of the larger newspaper offices in London, were briefly sketched; and the important position held by the press and the influence wielded by it in the various departments of life, were emphasized by a survey of the functions fulfilled and the wide sphere of its operations in the various parts of the world.

26.—“BOOKS.”

Delivered on Thursday, 30th April, by His Excellency Sir Chas. Bruce, K.C.M.G., Lieutenant-Governor.

The lecturer began by giving a succinct account of the earliest methods by which the thoughts and speech of mankind were transmitted to posterity, and traced the gradual development from oral transmission in ecclesiastical schools, through the stone monuments, the clay tiles, tablets and cylinders, the skin, wax and linen materials, and the broad sheets and rolls of the papyrus book, to the modern shaped book—through the stages of transcription by monks and bishops to the introduction of printing. The block-book was then referred to, and it was stated that the Mazarin Bible was probably the oldest of the printed books, in our acceptance of the term. The rarity of this Bible and the next earliest printed books was then touched upon, and illustrated by the exciting scenes at the recent sales of these works,

where the Bible fetched the price of £3,900 and the Latin Psalter, £4,950. The remarkable perfection in printing reached in the fifteenth and sixteenth centuries, and the attention paid to paper and illuminated and coloured type, were then pointed out, and the various types of the lovers of books were then described—the bibliophiles and bibliomaniacs being treated at considerable length, as to their habits, characteristics, peculiarities and their general relation to the history and preservation of books—a contrast being made with the so-called enemies of books, more especially to those who paid but little attention to the books as judged by their external features.

27.—“THE DISCOVERY OF AMERICA.”

Delivered on Tuesday, June 16th, by James Rodway, F.L.S., Assistant Secretary and Librarian.

The lecturer began by pointing out the importance of the Discovery of America. Considering the awakening that took place in Western Europe, no doubt America would soon have been discovered if Columbus had not undertaken the task. Columbus risked everything on the chance of his success, dominated by the great idea; and he struggled, heedless of difficulty and danger, against the obstructive policy of priests, courtiers and kings. After giving an outline of the state of Western Europe, in the fifteenth century, the lecturer proceeded to speak of the benefits resulting from the great discoveries of the Spaniards and Portuguese. More than three-fourths of the world was rendered accessible to Europe, with the ultimate result that petty monarchies became great kingdoms, while the provincial spirit of the Middle Ages gave place to that of the cosmopolitan of